

FILTER EFFECTIVENESS EVALUATION

INTERIM REPORT TFLRF No. 446

by
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**U.S. Army TARDEC Fuels and Lubricants Research Facility
Southwest Research Institute® (SwRI®)
San Antonio, TX**

for
**Jill M. Bramer
U.S. Army TARDEC
Force Projection Technologies
Warren, Michigan**

Contract No. W56HZV-09-C-0100 (WD17-Task 7)

UNCLASSIFIED: Distribution Statement A. Approved for public release

August 2013

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**Gary B. Bessee, Director
U.S. Army TARDEC Fuels and Lubricants
Research Facility (SwRI[®])**

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14. ABSTRACT Filtration systems on the HMMWV, Stryker, MRAP, Bradley Fighting Vehicle, and Heavy Tactical Vehicle applications were evaluated for effectiveness in water removal and particulate efficiency in the presence of alternative aviation fuels. These fuels included 50/50 blends of JP-8 with R-8, Tallow HEFA, IPK, Camelina HEFA, and SPK, as well as ULSD treated with mono-olein. Results indicate strong fuel/water separator compatibility with alternative fuels for each vehicle except the Stryker, although the Stryker fuel/water separator performed just as poorly with JP-8 as it did with alternative jet fuels. Particulate filters performed well above 10 µm(c), but yielded low capacity for the HMMWV and unstable contaminant loading for the Bradley Fighting Vehicle. Particulate filtration will need higher efficiencies for higher pressure injection systems, such as common rail.					
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EXECUTIVE SUMMARY

Concern for improved fuel emissions, development of new injection hardware, and logistics of available fuels present new challenges to vehicle fuel systems in the field. Sufficient validation of fuel system components is necessary to ensure the safety and reliability of vehicle operation. Filtration systems on the High Mobility Multi-Purpose Wheeled Vehicle (HMMWV), Stryker, MRAP, Bradley Fighting Vehicle, and Heavy Tactical Vehicles (DDC Series 60) applications were evaluated for effectiveness in water removal and particulate efficiency in the presence of alternative aviation fuels. These fuels included 50/50 blends of JP-8 with Syntroleum Corporation's synthetic R-8 jet fuel, hydroprocessed esters and fatty acids (HEFA) fuels derived from both Tallow and Camelina, Iso-Paraffinic Kerosene (IPK), and synthetic paraffinic kerosene (SPK), as well as Ultra Low Sulfur Diesel (ULSD) treated with mono-olein to simulate the effects of biodiesel. Results indicate strong water separator compatibility with alternative fuels for each vehicle except the Stryker. It is recommended for TARDEC to review any possible field issues with water contamination on the Stryker vehicle and upgrade the water removal system if it is deemed necessary. Particulate filters performed well above 10 $\mu\text{m(c)}$, but yielded low capacity for the HMMWV and unstable contaminant loading for the Bradley Fighting Vehicle. Particulate filtration will require increased efficiencies for higher pressure injection systems, such as common rail, which could be introduced to U.S. Army fleets in the near future. It is recommended for TARDEC to review the particulate efficiencies and capacities for each vehicle to determine if sufficient contaminant protection is in place on each of the vehicles under review.

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The authors would like to acknowledge the contribution of the TFLRF technical and administrative support staff.

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ACRONYMS AND ABBREVIATIONS

μm	Microns
BOT	Beginning of test
BUGL	Base upstream gravimetric level
CAT	Caterpillar Inc.
CI/LI	Corrosion inhibitor / lubricity improver
DDC	Detroit Diesel Corporation
dP	Differential pressure
DSEP	Portable separometer test for diesel fuel, ASTM D7261
EOT	End of test
FMTV	Family of Medium Tactical Vehicles
FSII	Fuel system icing inhibitor
g	Grams
GE	General Engine Powered Products
GPH	Gallons per hour
GPM	Gallons per minute
HEFA	Hydroprocessed esters and fatty acids
HEUI	Hydraulically actuated electronically controlled unit injector
HMMWV	High Mobility Multi-Wheeled Vehicle
IFT	Interfacial Tension
IPK	ISO-Paraffinic Kerosene
ISO	International Organization for Standardization
JP-8	Jet propellant 8
L	Liters
L/min	Liters per minute
MEUI	Mechanically actuated electronically controlled unit injector
mg/L	Milligrams per liter
MIL-PRF-5606	Hydraulic fluid required for ISO 19438 testing
min	Minute
mL/min	Milliliters per minute
mN/m	Millinewton per meter
MRAP	Mine-resistant ambush protected vehicle
MSEP	Portable separometer test for diesel fuel, ASTM D7224
NPTF	National pipe thread female
ppm	Parts per million
psi	Pounds per square inch
psid	Pounds per square inch differential
PT	Pressure-time injection system
SPK	Synthetic Paraffinic Kerosene
TARDEC	Tank-Automotive Research, Development, and Engineering Center
TFLRF	TARDEC Fuels and Lubricants Research Facility
ULSD	Ultra Low Sulfur Diesel

1.0 BACKGROUND

The effectiveness of filter elements is greatly affected by the environment of its application. Many variables can alter performance of both particulate filters as well as fuel/water separators. These include fuel quality, fuel composition, environmental cleanliness, fuel cleanliness, ambient temperatures, ambient humidity levels, fuel system pressures, and vehicle operating conditions, among many others. The greatest challenges to filter performance in the near future are based on the introduction of alternative fuels, both synthetic and bio-derived, to vehicle fuel systems.

In addition to fluid challenges, another challenge to filter performance are the operating requirements by hardware selections on the vehicle. Fuel pumps and injection systems are being designed for higher pressures to promote more complete combustion in the engine cylinders, and therefore better fuel economy, higher power output, and decreased emissions. All of these technological advances result in tighter injector and pump tolerances which are becoming increasingly sensitive to the presence of contaminants, both in the form of particulates and water in the fuel.

Sufficient analysis and qualification of filter products is becoming increasingly crucial in ground transportation vehicles to promote the longevity of equipment, sustainable maintenance costs, logistics of supplies, and safety of vehicle and equipment operators.

A typical commercial diesel fuel system is shown in Figure 1 to explain the positions of the fuel/water separator and the particulate filters. Also shown in Figure 2 is an example of such a filtration system as installed in a Family of Medium Tactical Vehicles (FMTV) application.

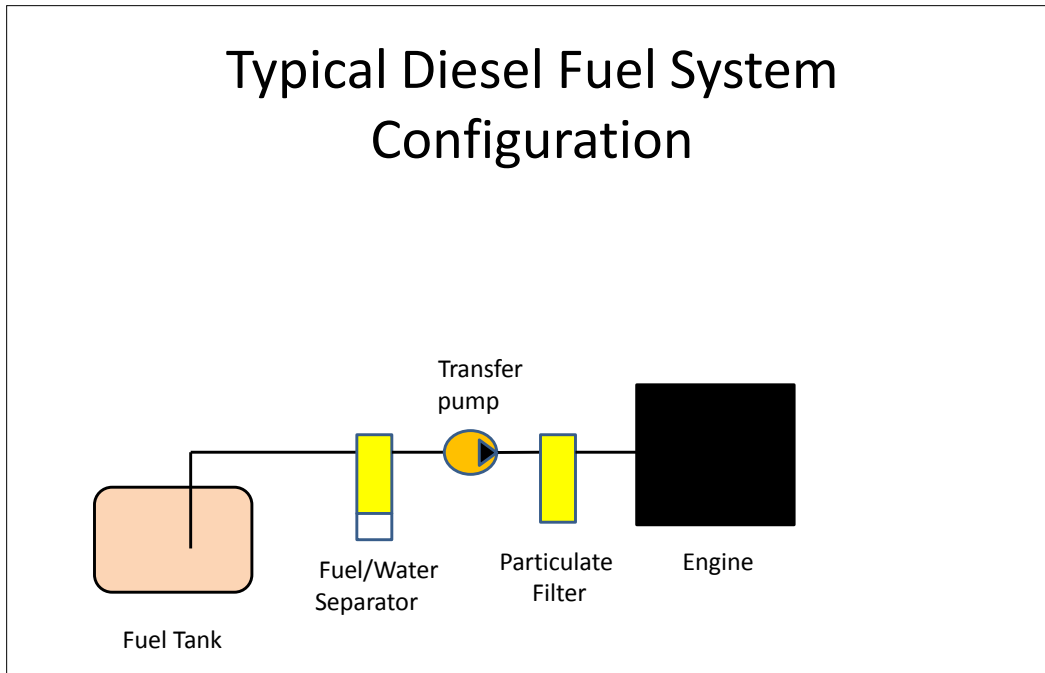


Figure 1. Typical Diesel Fuel System Configuration

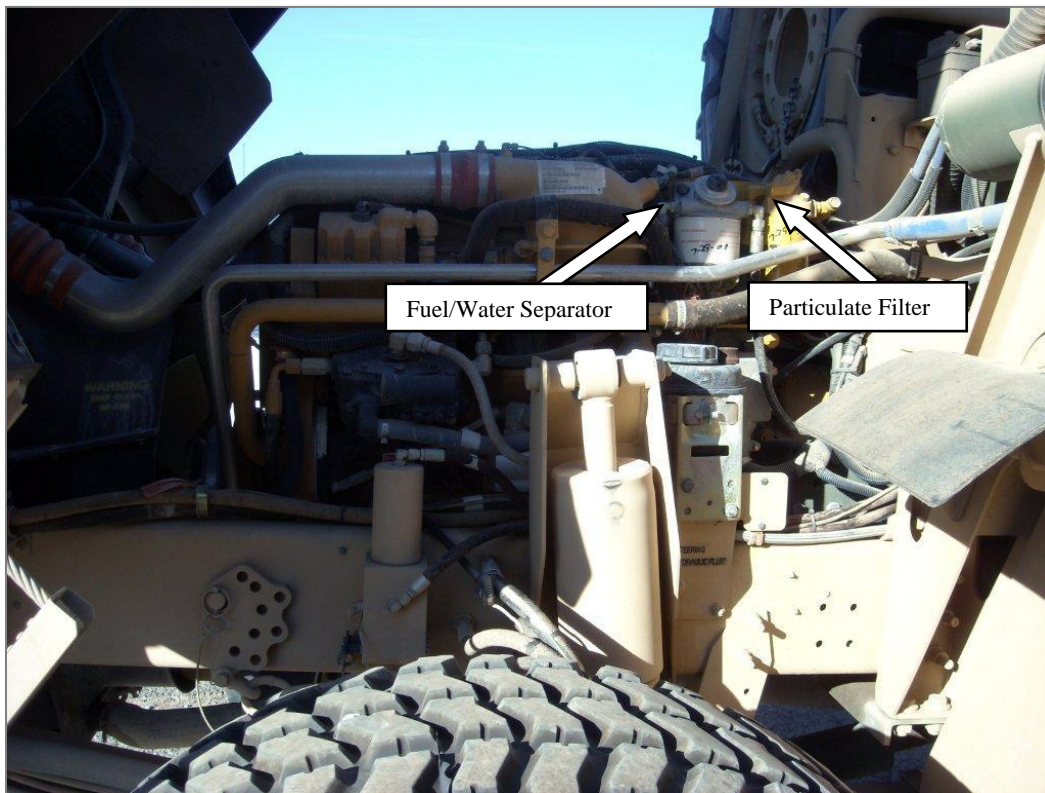


Figure 2. Example of FMTV Filtration System

2.0 INTRODUCTION

The task of Work Directive 17 is intended to evaluate fuel filters and fuel/water separators used in Army ground vehicles in the presence of alternative jet fuels. These fuels present an unknown challenge to filtration systems currently in use on military equipment. The filters to be tested are diesel filtration products that are currently used with military-sourced JP-8 aviation fuel.

3.0 PROGRAM OBJECTIVES

Intended outcomes for this test program are to quantify the effectiveness of filtration systems on emerging alternative fuels. It is uncertain whether the introduction of such fuels will require updates to filtration system choices on the vehicles of interest. This program will also determine the true effectiveness of these products in aviation fuel.

4.0 TEST ARTICLES

4.1 VEHICLE APPLICATIONS

Five vehicles were selected by TARDEC as representative of their military fleet. These vehicles included the HMMWV, Stryker, MRAP, Bradley Fighting Vehicle, and Heavy Tactical Vehicle. Each vehicle's filtration system was identified and tested accordingly for particulate filtration efficiency and water removal efficiency. Additional details on the vehicles selected are shown in Table 1 on the following page.

Table 1. List of Vehicle Applications and Hardware Specifications

Vehicle	Engine	Injection System
HMMWV	GE 6.5 L	Stanadyne Rotary Injection Pump (Pump-Line-Nozzle)
Stryker	CAT 3126	Hydraulically Actuated Electronically Controlled Unit Injector (HEUI)
MRAP	CAT C7 Inline 6 Cylinder	
Bradley Fighting Vehicle	Cummins 903 VTA	Pressure-Time (PT) Injection System
Heavy Tactical Vehicle (DDC Series 60)	DDC Series 60	Mechanically Actuated Electronically Controlled Unit Injector (MEUI)

4.2 SOURCING

4.2.1 Alternative Fuels

Representative alternative fuels were chosen from the TFLRF inventory to challenge the fuel/water separators. The fuels were identified as the current main alternatives to conventional aviation fuel that had the possibility of future integration into aviation fuel systems. These fuels included synthetic paraffinic kerosene (SPK), hydroprocessed esters and fatty acids (HEFA) fuels derived from both Tallow and Camelina feedstocks, Syntroleum Corporation's R-8 synthetic jet fuel derived from an animal/vegetable oil blend, iso-paraffinic kerosene (IPK), as well as a simulated biodiesel composed of ultra low sulfur diesel (ULSD) and mono-olein. As written in the scope of work, the alternative aviation fuels were blended to achieve 50/50 vol% test fuels.

JP-8 aviation fuel was used as a 50% blending component for the alternative fuels was JP-8. This fuel was formulated by clay treating Jet A fuel to remove any possible contaminants or trace additives and was additized to the JP-8 composition according to the concentration requirements in MIL-DTL-83133 using Stadis 450 as the static dissipater, DCI-4A as the corrosion inhibitor/lubricity improver (CI/LI), and DIEGME as the fuel system icing inhibitor (FSII).

4.2.2 Fuel/Water Separators

Filter manufacturers of the various fleet vehicles were contacted to determine part numbers of filters used in the field. Fuel/water separators were identified for each of the five military

vehicles and were acquired in quantities of six per model number. SwRI identification numbers were assigned to each fuel/water separator and are listed in Table 2 below. Only one fuel/water separator from each vehicle was tested in each fuel blend.

Table 2. Fuel/Water Separators Selected

Vehicle	Fuel/Water Separator	SwRI Filter ID for SAE J1488 Testing					
		Set 1	Set 2	Set 3	Set 4	Set 5	Set 6
HMMWV	Kaydon A910162	FL12-1110	FL12-1120	FL12-1118	FL12-1111	FL12-1116	FL12-1113
Stryker	Racor R90P2430	FL12-1239	FL12-1235	FL12-1236	FL12-1240	FL12-1238	FL12-1269
MRAP	Racor 2020SM	FL12-1151	FL12-1223	FL12-1194	FL12-1168	FL12-1172	FL12-1270
Bradley Fighting Vehicle	Fleetguard FS1000	FL12-1092	FL12-1096	FL12-1095	FL12-1094	FL12-1093	FL12-1097
Heavy Tactical Vehicle	Fleetguard FF5369W	FL12-1208	FL12-1205	FL12-1204	FL12-1206	FL12-1207	FL12-1264

4.2.3 Particulate Filters

Filter manufacturers of various fleet vehicles were contacted to determine part numbers of filters used in the field. The particulate filters for each engine and vehicle were selected and acquired. The filter models are listed in Table 3, as well as the associated SwRI tracking numbers assigned to each filter as it was received in the lab. Only one filter from each vehicle application was tested.

Table 3. Particulate Filters Selected

Vehicle	Filter Model	SwRI Filter ID for ISO 19438 Testing
HMMWV	Kaydon A910162	FL12-1112
Stryker	CAT 1R-0749	FL12-1105
MRAP	CAT 1R-0751	FL12-1142
Bradley Fighting Vehicle	Fleetguard FS1006	FL12-1196
Heavy Tactical Vehicle	Detroit Diesel Power Guard 23530707	FL12-1198

5.0 DETAILS OF EVALUATION

5.1 PROCEDURES

5.1.1 SAE J1488

The primary test method for this program is SAE J1488 entitled, “Emulsified Water/Fuel Separation Test Procedure.” This test method is the greatest discriminator on alternative fuel filtration performance, as the fuel/water separators examined by this method are greatly affected by fuel composition. This is due to the different interfacial tension (IFT) of each fuel, which measures the force required to pull a platinum ring through a boundary layer of fuel and water. Lower IFT values indicate that the ring can be pulled through the fuel/water interface easily, meaning the fuel is more miscible with the water. This composition makes it difficult for a fuel/water separator to perform effectively. Higher IFT values indicate the opposite, in which the ring requires more force to move between the layers, meaning the fuel and water do not mix easily, and are an easier challenge for a fuel/water separator.

This SAE J1488 test utilizes a single-pass style flow loop with continuous water injection upstream of the fuel/water separator under test. The single-pass design includes a cleanup fuel/water separator located downstream to remove all water remaining in the fuel before returning to the sump.

Water is injected at a steady rate throughout the test at 2500 ppm based on the fuel flow. Injection occurs upstream of a centrifugal pump on the test stand which emulsifies and finely disperses the water droplets in the fuel flow before being presented to the fuel/water separator under test. The main system flow circulates at 5 GPM, and a slip-stream flow loop allows for the emulsified blend of water and fuel to be throttled to the specific flow rate required for testing while maintaining the same water droplet size distribution throughout.

The water droplet size distribution is a function of the fuel chemistry and IFT, and presents an increasing challenge to the fuel/water separators at smaller droplet sizes. This distribution for each of the alternative fuels was recorded by use of an online particle size analyzer on the SAE J1488 test stand to provide initial understanding of the fuel behavior prior to testing. This

examination revealed the median value of the particle size distribution (D_{50}) of water droplet sizes to be between 10 and 13 $\mu\text{m(c)}$ in JP-8 fuel, as well as the JP-8 blends with R-8, IPK, and Tallow HEFA fuels. The JP-8 blends with SPK and Camelina HEFA exhibited smaller sizes with D_{50} values between 7 and 9 $\mu\text{m(c)}$, which led to an initial expectation that fuel/water separators in these fuels may have lower efficiencies than in other fuels in the test program.

The test conditions for each test element were based on manufacturer specifications and are shown in Table 4.

Table 4. SAE J1488 Test Conditions

Vehicle	Fuel/Water Separator	Flow Rate (GPM)	Flow Rate (L/min)
HMMWV	Kaydon A910162	0.75	2.84
Stryker	Racor R90P2430	1.50	5.70
MRAP	Racor 2020SM	1.50	5.70
Bradley Fighting Vehicle	Fleetguard FS1000	1.50	5.70
Heavy Tactical Vehicle	Fleetguard FF5369W	1.50	5.70

5.1.2 ISO 19438

The test method used to evaluate the particulate removal efficiency of the vehicle filters was ISO 19438 entitled, “Diesel fuel and petrol filters for internal combustion engines – Filtration efficiency using particle counting and contaminant retention capacity.”

This procedure utilizes a multi-pass style flow loop with continuous contaminant injection upstream of the test element. The test examines the particle efficiency of the filter by recording upstream and downstream particle counts every minute. This continues until the filter reaches a specified Terminal Differential Pressure due to contaminant loading. The final quantity of contaminant injected and contaminant retained are recorded in the test data, as well as the differential pressure as a function of contaminant added.

The specific conditions for the vehicle particulate filters are shown below in Table 5. Particle count sizes were the same for all filters to provide a consistent basis for comparison at 4, 6, 8, 10, 12, 15, 25, and 30 $\mu\text{m(c)}$.

Table 5. ISO 19438 Test Conditions

Vehicle	Particulate Filter	Flow Rate (GPM)	Base Upstream Gravimetric Level (mg/L)	Terminal Differential Pressure (psid)
HMMWV	A910162	1.0	50	10
Stryker	CAT 1R-0749	1.5	50	10
MRAP	CAT 1R-0751	1.5	50	10
Bradley Fighting Vehicle	Fleetguard FS1006	1.5	50	10
Heavy Tactical Vehicle	Detroit Diesel Power Guard 23530707	1.5	50	10

5.2 TEST FLUIDS AND CONTAMINANTS

5.2.1 SAE J1488

In addition to the previously described alternative jet fuels, ultra low sulfur diesel was used as the final test fuel and was additized with mono-olein. This is the typical fuel used in water separation testing across the filtration industry. Mono-olein is a byproduct of the biodiesel refinement process and is used as an additive in ULSD to lower the IFT of the fuel to levels characteristic of typical biodiesel blends in the range of 12 to 15 mN/m. By comparison, typical untreated ULSD has an IFT near 30 mN/m. Additional benefit comes from the similarities in chemical composition of mono-olein to biodiesel, which provide similar fuel behavior during testing. This additive was introduced to standardized testing in an effort by the SAE Filter Test Method Committee during SAE J1488 revisions to define a repeatable fuel challenge for biofuels. Uniformity of biodiesel batches from refineries have varied greatly in composition, due to the variety and seasonal effects of feedstock sources as well as the many possible refinement processes. The use of mono-olein in fuel/water separation testing serves as a consistent and repeatable component to additize ULSD and create a simulated biodiesel with a representative IFT value of field biodiesels.

Deionized water was used as the water source for the injection system in SAE J1488 testing. This presented the upstream challenge of emulsified water to the test element.

5.2.2 ISO 19438

For the multi-pass test, the system fluid was hydraulic fluid per the MIL-PRF-5606 specification. Standardized test dust was used for multi-pass efficiency testing according to ISO 12103-1 A3 medium grade. This is the dust required by the ISO 19438 procedure and presents a thorough challenge to the fuel filter across a range of particle sizes as shown in Table 6 below.

Table 6. A3 Test Dust Particle Size Distribution by Volume Percent

Size, µm	1	2	3	4	5	7	10	20	40	80	120
% Less Than	1.0–3.0	4.0–5.5	7.5–9.5	10.5–13.0	15.0–19.0	28.0–33.0	40.0–45.0	65.0–69.0	84.0–88.0	99.0–100	100

6.0 EVALUATIONS, DISCUSSIONS, AND RESULTS

6.1 WATER REMOVAL TESTS

An initial baseline test was run to confirm the performance of the stand, as well as to confirm the absence of any residual mono-olein from previous tests. This baseline test was performed on the Kaydon A900375 water separator using JP-8 fuel. This fuel/water separator was selected as it was similar to the Kaydon A910162 used on the HMMWV, its performance was understood from previous testing at SwRI, and this part number was available on-hand in SwRI's inventory. The average water removal efficiency was recorded as 98.4% which was deemed acceptable for testing to begin. The results are shown in Appendix A.

6.1.1 HMMWV, MRAP, Bradley Fighting Vehicle, and Heavy Tactical Vehicle Tests

SAE J1488 results are summarized in Table 10 in Section 6.1.4. Complete test data sheets for each fuel/water separator are included in APPENDIX A.

The fuel/water separators from the HMMWV, MRAP, Bradley Fighting Vehicle, and Heavy Tactical Vehicle applications all completed testing with high efficiencies across the various aviation fuels, however each performed poorly in ULSD with mono-olein. The Stryker fuel/water separator performed with the lowest cumulative water removal efficiency and is examined in further detail in Section 6.1.2.

Across the alternative jet fuels, all fuel/water separators except the Stryker performed exceptionally well. The average water removal efficiencies for each vehicle across all five alternative jet fuels, excluding ULSD with mono-olein, are shown in Table 7. These are near ideal results for the HMMWV, MRAP, Bradley Fighting Vehicle, and Heavy Tactical Vehicle, especially with the previously unknown separability conditions of the alternative fuels.

Table 7. Average Efficiencies of Each Fuel/Water Separator Across Alternative Jet Fuels

Vehicle	Fuel/Water Separator	Average Efficiency
HMMWV	Kaydon A910162	99.2%
Stryker	Racor R90P2430	72.6%
MRAP	Racor 2020SM	100.0%
Bradley Fighting Vehicle	Fleetguard FS1000	99.3%
Heavy Tactical Vehicle	Fleetguard FF5369W	99.8%

Each of these fuel/water separators performed at much lower efficiencies in ULSD with mono-olein. All vehicles combined to average a water removal efficiency of 35.3% across the completed test times. Both the Stryker and the Bradley Fighting Vehicle fuel/water separators did not complete the ULSD water separation test. The runs were terminated due to decreasing water removal efficiencies that became effectively zero by the termination point. This is not uncommon for certain types of fuel/water separators that are not specifically designed for biodiesel conditions.

The IFT values for each fuel blend are averaged across all testing in each fuel and are presented in Table 8 below. The ULSD and mono-olein presented the lowest IFT, and therefore the greatest challenge to the fuel/water separators during testing. This was an extreme challenge compared to the IFT of the alternative aviation fuels, which can range from 30.6 to 32.4 mN/m. The ULSD condition was 61% lower in IFT than each of these alternative aviation fuels. For comparison, the expected IFT of untreated diesel fuel can be 30 to 40 mN/m, and the IFT of biodiesels can be between 12 and 15 mN/m. This difference of IFT is the greatest indicator in each fuel/water separator's performance in the various fuels.

Table 8. Average IFT of Each Alternative Jet Fuel Blend

Fuel Blend (50/50)	Average IFT (mN/m)
R-8 / JP-8	30.9
Tallow HEFA / JP-8	32.4
IPK / JP-8	32.4
Camelina HEFA / JP-8	30.6
SPK / JP-8	31.3
ULSD with Mono-olein	12.2

6.1.2 Stryker Tests

The Stryker fuel/water separators performed with the lowest water removal efficiencies of all vehicles. The elements were selected as a Parker-recommended commercial equivalent to those used on the Stryker vehicle, and were received with a thin film of oil residue on the canister and tap plate, as shown in Figure 3. Following the first Stryker test, residues were also noticed in the water collected by the cleanup fuel/water separators on the test stand. Based on these observations of low efficiency and oil residue, it was decided by TARDEC and TFLRF to conduct additional testing on a second set of commercial fuel/water separators, as well as a third set consisting of the original government parts.

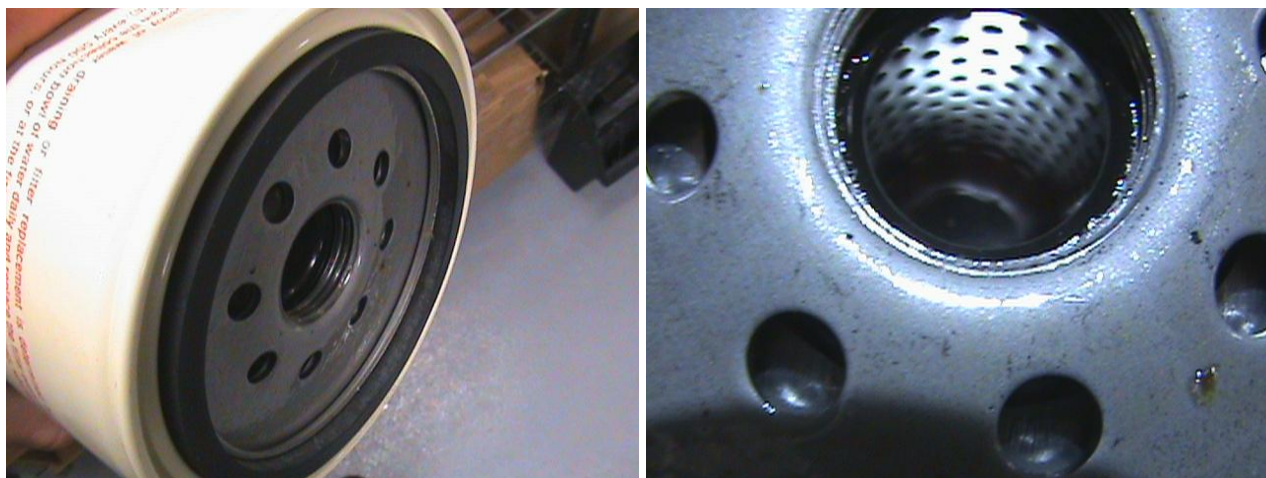


Figure 3. Residue on Stryker Commercial Fuel/Water Separators

The second set of commercial Stryker fuel/water separators obtained for additional testing were Racor 490P30 and had identical canisters and internal components as the first set. The difference in model number indicates the absence of the 24 V heater in the mounting head assembly. This was acceptable as the heater was unused during all testing, and this model had a shorter lead time for procurement.

Obtaining the government fuel/water separator through Parker Racor's local distributors at the beginning of the project was not possible due to policies concerning the sale of government-specific parts to SwRI as a non-government entity. At the time of additional testing, SwRI approached the manufacturing department of Parker Racor directly and received a specific batch of fuel/water separators made per the government specification for Racor 400R-GDLS-01 and were assigned a unit number of S3226P upon completion. SwRI part numbers were assigned to both sets of additional fuel/water separators in Table 9.

Table 9. List of Additional Stryker Fuel/Water Separators Received

Vehicle	Fuel/Water Separator	SwRI Filter ID for SAE J1488 Testing					
		Set 1	Set 2	Set 3	Set 4	Set 5	Set 6
Stryker, Commercial Equivalent	Racor 490P30	FL13-1311	FL13-1308	FL13-1312	FL13-1309	FL13-1307	FL13-1310
Stryker, Government Specification	Racor 400R-GDLS-01 (S3226P)	FL13-1319	FL13-1314	FL13-1315	FL13-1316	FL13-1317	FL13-1318

Both sets of additional fuel/water separators arrived with the same oil film present. Parker engineers confirmed this was to be expected. The oil films were applied during production for corrosion protection of the tap plate and to lubricate the gasket to insure a leak-tight seal during installation. Parker claimed the residue would not affect the performance of the fuel/water separator, however the possible interactions between the residue and alternative fuels used in this study may have had unforeseen effects on the efficiencies.

The two sets of tests with commercial products exhibited inconsistent repeatability for the alternative fuels. The original commercial fuel/water separator achieved an average water removal efficiency of 72.6% across the various aviation fuels, not including the ULSD. The additional set of commercial fuel/water separator tests averaged 74.6% across the same aviation fuels, however each blend had an average variation between the first and second runs of 29.4%. This indicates large swings in the repeat efficiencies that is not typical of most fuel/water separators.

Tests with the government specification Stryker fuel/water separator achieved a higher average efficiency across the aviation fuels of 83.2%. This indicates the government model provides increased protection of the fuel system from water contamination. Many manufacturer specifications have required water removal efficiencies of 95% and higher.

6.1.3 Stryker Tests using Jet A and JP-8

To further investigate the questionable performance of the Stryker fuel/water separators, two baseline tests were performed in Jet A (clay-treated) and JP-8 on the government specification filters (Racor 400R-GDLS-01). At 89.8% efficiency, the filter performed as might be expected in the Jet A. Once the fuel was additized to JP-8 the efficiency fell to 77.1%. This demonstrates that these fuel/water separators experience similar performance issues with conventional petroleum-based fuel and the problem is not unique to the alternative fuel blends.

6.1.4 Summary of Results

Table 10. SAE J1488 Test Results on Alternative Fuels

Set	Fuel Blend (50/50)	Additives	SwRI Fuel ID	Fleet Type	Filter	SwRI Filter ID	Filter Efficiency
Set 1	R-8 (AF8145)/ clay treated Jet A	Stadis 450 (1 mg/L), CI/I (15 mg/L), FSII (0.15wt%)	FL12-1138	HMMWV	Kaydon A910162	FL12-1110	100%
				Stryker	Racor R90P2430	FL12-1239	27.20%
				MRAP	Racor 2020SM	FL12-1151	100%
				Bradley Fighting Vehicle	Fleetguard FS1000	FL12-1092	100%
				DDC Series 60	Fleetguard FF5369W	FL12-1208	100%
Set 2	Tallow HRJ (AF8146)/ clay treated Jet A	Stadis 450 (1 mg/L), CI/I (15 mg/L), FSII (0.15wt%)	FL12-1164	HMMWV	Kaydon A910162	FL12-1120	100%
				Stryker	Racor R90P2430	FL12-1235	77.50%
				MRAP	Racor 2020SM	FL12-1223	100%
				Bradley Fighting Vehicle	Fleetguard FS1000	FL12-1096	96.70%
				DDC Series 60	Fleetguard FF5369W	FL12-1205	99.40%
Set 3	IPK (AF8147)/ clay treated Jet A	Stadis 450 (1 mg/L), CI/I (15 mg/L), FSII (0.15wt%)	FL12-1139	HMMWV	Kaydon A910162	FL12-1118	100%
				Stryker	Racor R90P2430	FL12-1236	72.50%
				MRAP	Racor 2020SM	FL12-1194	100%
				Bradley Fighting Vehicle	Fleetguard FS1000	FL12-1095	100%
				DDC Series 60	Fleetguard FF5369W	FL12-1204	100%
Set 4	Camelina HRJ/ clay treated Jet A	Stadis 450 (1 mg/L), CI/I (15 mg/L), FSII (0.15wt%)	FL12-1141	HMMWV	Kaydon A910162	FL12-1111	100%
				Stryker	Racor R90P2430	FL12-1240	86%
				MRAP	Racor 2020SM	FL12-1168	100%
				Bradley Fighting Vehicle	Fleetguard FS1000	FL12-1094	100%
				DDC Series 60	Fleetguard FF5369W	FL12-1206	100%
Set 5	SPK/clay treated Jet A	Stadis 450 (1 mg/L), CI/I (15 mg/L), FSII (0.15wt%)	FL12-1140	HMMWV	Kaydon A910162	FL12-1116	96%
				Stryker	Racor R90P2430	FL12-1238	100%
				MRAP	Racor 2020SM	FL12-1172	100%
				Bradley Fighting Vehicle	Fleetguard FS1000	FL12-1093	100%
				DDC Series 60	Fleetguard FF5369W	FL12-1207	99.60%
Set 6	Ultra low sulfur diesel fuel	Monoolein- IFT target 12-15 mN/m		HMMWV	Kaydon A910162	FL12-1113	65.60%
				Stryker	Racor R90P2430	FL12-1269	DNF (50 min - 22.6%)
				MRAP	Racor 2020SM	FL12-1270	34.50%
				Bradley Fighting Vehicle	Fleetguard FS1000	FL12-1097	DNF (130 min - 10.8%)
				DDC Series 60	Fleetguard FF5369W	FL12-1264	43.10%
Set 7 Additional Stryker Testing	IPK (AF8147)/ clay treated Jet A	Stadis 450 (1 mg/L), CI/I (15 mg/L), FSII (0.15wt%)	FL12-1139	Stryker – Government Filter	Racor 400R-GDLS-01 (S3226P)	FL13-1315	85.60%
				Stryker – Commercial Filter	Racor 490P30	FL13-1312	98.10%
	R-8 (AF8145)/ clay treated Jet A	Stadis 450 (1 mg/L), CI/I (15 mg/L), FSII (0.15wt%)	FL12-1138	Stryker – Government Filter	Racor 400R-GDLS-01 (S3226P)	FL13-1319	97.40%
				Stryker – Commercial Filter	Racor 490P30	FL13-1311	78.80%
	Tallow HRJ (AF8146)/ clay treated Jet A	Stadis 450 (1 mg/L), CI/I (15 mg/L), FSII (0.15wt%)	FL12-1164	Stryker – Government Filter	Racor 400R-GDLS-01 (S3226P)	FL13-1314	82.00%
				Stryker – Commercial Filter	Racor 490P30	FL13-1308	56.40%
	Camelina HRJ/ clay treated Jet A	Stadis 450 (1 mg/L), CI/I (15 mg/L), FSII (0.15wt%)	FL12-1141	Stryker – Government Filter	Racor 400R-GDLS-01 (S3226P)	FL13-1316	82.00%
				Stryker – Commercial Filter	Racor 490P30	FL13-1309	51.60%
	SPK/clay treated Jet A	Stadis 450 (1 mg/L), CI/I (15 mg/L), FSII (0.15wt%)	FL12-1140	Stryker – Government Filter	Racor 400R-GDLS-01 (S3226P)	FL13-1317	69.00%
				Stryker – Commercial Filter	Racor 490P30	FL13-1307	88.00%
	Ultra low sulfur diesel fuel	Monoolein- IFT target 12-15 mN/m		Stryker – Commercial Filter	Racor 490P30	FL13-1310	0.00%
				Stryker – Government Filter	Racor 400R-GDLS-01 (S3226P)	FL13-1318	DNF (90 min -5.8%)

6.2 PARTICULATE EFFICIENCY TESTS

6.2.1 Vehicle Tests

Multi-pass testing was completed for all vehicle types according to ISO 19438. Summaries of results for each filter are presented in Table 11 in Section 6.2.2 and include average particulate filtration efficiency and capacity of each element. Efficiencies are reported as a summary and include performance at small, medium, and large sizes as expected to be seen in operation. Supplemental multi-pass data, including minute by minute efficiencies throughout testing, are included in APPENDIX B through APPENDIX F.

All filters performed with high efficiency at large particle sizes, and all filters yielded efficiencies of 92% or higher at 10 $\mu\text{m(c)}$ and efficiencies of 96% or higher at 25 $\mu\text{m(c)}$. The Fleetguard FS1006 from the Bradley Fighting Vehicle was unable to load contaminant to the specified terminal differential pressure of 10 psid, indicating a possible failure in the media. This would allow contaminant through the filter, preventing additional loading, and preventing additional increase in differential pressure. Data from this test run is included in Appendix E, and shows the efficiencies during the first 42 minutes of loading. This is the period in which the filter's differential pressure behaved as expected by increasing with the rate of contaminant addition. The subsequent pages in the data sheet describe the variation in the filter's loading characteristics until the test was terminated. Capacity values for this filter represent only the relevant performance during the first 42 minutes of loading and do not describe the filter's maximum capacity.

All remaining filters were capable of removing a high percentage of particles larger than 10 $\mu\text{m(c)}$ from the system, which is typical of particulate filters in diesel applications. Efficiencies at smaller particle sizes of 4 and 6 $\mu\text{m(c)}$ will be of greater importance as more modern injection systems are introduced to military applications, namely high pressure common rail systems, as these are much more intolerant of fine particles than the injection systems of the vehicles considered in this program.

Several other parameters are included in the data sheets in APPENDIX B through APPENDIX F, as well. Differential pressure was tracked throughout the course of contaminant injection to each

filter. This is plotted over time for each filter and can be useful to determine the loading behavior of the filter. Typical loading patterns cause an increase in differential pressure as contaminant is injected to the filter until it reaches terminal differential pressure. These patterns can be linear, but more commonly they are exponential and depict a sharp and increasing rise in pressure once the filter reaches roughly 50 to 75% of its total capacity until 100% is achieved. Problem areas in filter loading are noted when differential pressure decreases due to bypass valves opening in oil filters or ruptures in the media, or when differential pressure no longer increases and remains constant due to leaks in the end caps or internal surfaces of the filter.

Particle counts are also reported in APPENDIX B through APPENDIX F to provide the basis for the efficiency calculations at each point in time throughout the test. This provides greater detail as to the concentrations of particles present in the system and the change in the filter's performance as the test progressed. Similarly, the filtration ratios are presented for the filters to provide a finer resolution when comparing high efficiencies. The relationship between filtration ratio and efficiency is defined below. The higher the filtration ratio, the better the performance of the filter.

$$Filtration\ Ratio = \frac{1}{1 - \frac{Efficiency}{100}}$$

6.2.2 Summary of Test Results

Table 11. ISO 19438 Test Results

Test	Fleet Type	Filter	SwRI Filter ID	6 µm(c) Efficiency	10 µm(c) Efficiency	25 µm(c) Efficiency	Capacity (g)
1	HMMWV	A910162	FL12-1112	78.58%	99.87%	100.00%	7.67
2	Stryker	CAT 1R-0749	FL12-1105	98.41%	99.95%	99.98%	109.88
3	MRAP	CAT 1R-0751	FL12-1142	88.31%	95.15%	96.54%	44.67
*4	Bradley Fighting Vehicle	FS1006	FL12-1196	69.04%	92.84%	99.94%	11.10
5	Heavy Tactical Vehicle	23530707	FL12-1198	77.34%	96.65%	99.94%	31.68
<i>Test #4 was terminated early due to inability to reach terminal differential pressure</i>							

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1 FUEL/WATER SEPARATORS

Following the test program, it can be concluded that all current fuel/water separators deployed in the field on the military vehicles considered, except for the Stryker vehicle, are sufficient to perform with the alternative aviation fuels tested in this program. The Stryker vehicle's fuel/water separators showed poor repeatability and were significantly less effective, whether operating with current petroleum-based fuels (JP-8, clay-treated Jet A) or with alternative aviation fuels tested, than the other four vehicles. It is recommended for TARDEC to review any possible issues with water contamination to the CAT 3126 engine and its associated HEUI injection system.

Fuel/water separation performance in simulated biodiesel also caused reason for concern. Given that JP-8 is the fuel of choice for military fleets, it is not expected for biodiesel to be used in the vehicles tested in the near future. However, test results with this fuel give understanding to the limits of the capabilities of the fuel/water separators currently in use.

Based on the experience of previous TFLRF fuel/water separator evaluations in JP-8 fuel and knowledge of the Stryker filter through this test program, it is expected that the Stryker filter will perform reasonably well under less demanding fuel conditions with the typical JP-8 fuel used in military applications.

Future fuel injection systems can cause potential problems for the fuel/water separators currently in use. As high pressure common rail systems are being introduced to military fleets, attention must be given to the allowable water concentrations by each injector manufacturer, as these requirements are significantly tighter than those of unit injectors and other systems currently in use in most of the military fleets.

7.2 PARTICULATE FILTERS

The particulate filters for the vehicles under the test performed acceptably for their applications. The efficiencies and capacities vary per application and filtration surface area. For any high pressure common rail fuel system particulate efficiency will need to be addressed as the critical particle size to cause abrasive damage is less than the particles sizes recorded in this report.

UNCLASSIFIED

APPENDIX A.
SAE J1488 TEST RESULTS

UNCLASSIFIED

Filter: FL12-1130, Kaydon A900375

Fuel: JP-8

Table A-1. SAE J1488 Baseline Test in JP-8

**Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet**

Client:	US Army	Test Number:	Baseline
Project Number:	WD-17	Filter ID:	FL12-1130
Test Engineer:	P. Canant	Test Date:	5/24/2012
Test Fluid:	Jet-A	Test Fluid Flow Rate (LPM):	3.75
Water Injection Rate (mL/min):	2500	Test Temperature (°C):	25
Water Saturation Limit (ppm):		Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	36.131	
EOT	35.045	

DSEP	Before Additive	After Additive
BOT	88	
EOT	95	

Baseline	79
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Amount of ULSD added
Amount of Mono added
Density of fuel
0.767
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	37	79		0.08	0	0
2	10	127	93	14	0.48	0	0.1
3	30	1937	164	85	1.83	0	0.5
4	50	2384	237	158	3.44	80	0.5
5	70	4306	39	0	4.47	350	0.5
6	90	520	137	58	3.88	460	0.5
7	110	4457	31	0	4.01	215	0.5
8	130	2456	43	0	3.9	230	0.5
9	150	2802	172	93	3.99	200	0.5

Average Water Content (ppm):	115
Time Weighted Average Water Removal Efficiency:	98.4
Water from Test Housing (mL):	1535
Water from Cleanup Filters (mL):	100

Actual Test Time (min)	150
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Average Upstream	2373.63
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Filter: FL12-1110, Kaydon A910162

Fuel: FL12-1138, 50/50 R-8 and JP-8

Vehicle: HMMWV

Table A-2. HMMWV SAE J1488 Results in R-8 and JP-8

**Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet**

Client:	US Army	Test Number:	2
Project Number:	100884	Filter ID:	FL12-1110
Test Engineer:	P. Canant	Test Date:	6/18/2012
Test Fluid:	FL12-1138	Test Fluid Flow Rate (LPM):	2.84
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	38.761	
EOT	36.881	

Amount of ULSD added

Amount of Mono added

Density of fuel

0.77

Density of water

0.998

	Before Additive	After Additive
DSEP		
BOT	97	
EOT	100	

Baseline	142	Drained Filter Housing Every Ten Minutes
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Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	142	58		10.13	0	1
2	10	2126	81	0	10.81	0	1
3	30	2561	45	0	13.29	100	1
4	50	2352	94	0	14.49	125	1
5	70	2601	71	0	14.65	140	2
6	90	2791	57	0	14.86	140	2
7	110	2831	50	0	15.02	135	2
8	130	2673	59	0	15.85	150	2
9	150	2872	51	0	16.41	140	2

Average Water Content (ppm):	64
Time Weighted Average Water Removal Efficiency:	100.0
Water from Test Housing (mL):	930
Water from Cleanup Filters (mL):	100

Actual Test Time (min)	150
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Average Upstream	2600.88
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Filter: FL12-1239, Racor R90P2430

Fuel: FL12-1138, 50/50 R-8 and JP-8

Vehicle: Stryker

Table A-3. Stryker SAE J1488 Results in R-8 and JP-8

Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet

Client:	US Army	Test Number:	21
Project Number:	100884	Filter ID:	FL12-1239
Test Engineer:	P. Canant	Test Date:	10/18/2012
Test Fluid:	FL12-1138	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	35.901	
EOT	33.875	

DSEP	Before Additive	After Additive
BOT	91	
EOT	87	

Baseline 121

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	118	121		3.5	0	0.1
2	10	2509	1619	1498	4.5	10	0.1
3	30	2604	2064	1943	4.6	25	0.2
4	50	2177	1770	1649	4.8	15	0.2
5	70	2385	1605	1484	5.0	30	0.2
6	90	2382	1997	1876	5.3	10	0.2
7	110	2589	2137	2016	5.7	10	0.2
8	130	2401	2054	1933	6.0	15	0.2
9	150	2421	1753	1632	6.3	10	0.3

Average Water Content (ppm):	1875
Time Weighted Average Water Removal Efficiency:	27.2
Water from Test Housing (mL):	125
Water from Cleanup Filters (mL):	2050

Amount of ULSD added
Amount of Mono added
Density of fuel
0.771
Density of water
0.998

Actual Test Time (min)	150
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Average Upstream	2433.50
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Filter: FL12-1151, Racor 2020SM

Fuel: FL12-1138, 50/50 R-8 and JP-8

Vehicle: MRAP

Table A-4. MRAP SAE J1488 Results in R-8 and JP-8

Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet

Client:	U.S. Army	Test Number:	3
Project Number:	100884	Filter ID:	FL12-1151
Test Engineer:	P. Canant	Test Date:	6/18/2012
Test Fluid:	FL12-1138	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	36.881	
EOT	37.515	

DSEP	Before Additive	After Additive
BOT	100	
EOT	94	

Baseline	84
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Amount of ULSD added

--

Amount of Mono added

--

Density of fuel

0.77

Density of water

0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	58	84		22.42	0	3
2	10	3087	44	0	22.54	0	3
3	30	2797	49	0	24.04	0	3
4	50	2826	85	1	24.63	160	3
5	70	3016	143	59	25.06	325	3
6	90	2573	119	35	24.86	280	3
7	110	2942	109	25	24.91	300	3
8	130	2866	83	0	25.08	280	3
9	150	2863	60	0	24.58	300	3

Average Water Content (ppm):	87
Time Weighted Average Water Removal Efficiency:	99.8
Water from Test Housing (mL):	1645
Water from Cleanup Filters (mL):	100

Actual Test Time (min)	150
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Average Upstream	2871.25
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Filter: FL12-1092, Fleetguard FS1000

Fuel: FL12-1138, 50/50 R-8 and JP-8

Vehicle: Bradley Fighting Vehicle

Table A-5. Bradley Fighting Vehicle SAE J1488 Results in R-8 and JP-8

Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet

Client:	US Army	Test Number:	1
Project Number:	WD-17	Filter ID:	FL12-1092
Test Engineer:	P. Canant	Test Date:	6/1/2012
Test Fluid:	FL12-1138	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	40.076	
EOT	39.83	

DSEP	Before Additive	After Additive
BOT	96	
EOT	99	
Baseline	169	

Amount of ULSD added
Amount of Mono added
Density of fuel
0.768
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	169	119		4.99	0	0.5
2	10	3442	106	0	5.68	23	0.5
3	30	2704	95	0	5.61	250	0.5
4	50	2998	94	0	6.14	275	0.5
5	70	2502	95	0	6.34	270	0.5
6	90	2495	107	0	6.78	272	0.5
7	110	2638	63	0	6.71	265	0.5
8	130	2738	70	0	6.91	260	0.5
9	150	2625	80	0	7.01	270	0.5

Average Water Content (ppm):	89
Time Weighted Average Water Removal Efficiency:	100.0
Water from Test Housing (mL):	1885
Water from Cleanup Filters (mL):	100

Actual Test Time (min)	150
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Average Upstream	2767.75
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Filter: FL12-1208, Fleetguard FF5369W

Fuel: FL12-1138, 50/50 R-8 and JP-8

Vehicle: Heavy Tactical Vehicle

Table A-6. Heavy Tactical Vehicle SAE J1488 Results in R-8 and JP-8

**Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet**

Client:	US Army	Test Number:	20
Project Number:	100884	Filter ID:	FL-12-1208
Test Engineer:	P. Canant	Test Date:	10/16/2012
Test Fluid:	FL12-1138	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	33.936	
EOT	31.372	

DSEP	Before Additive	After Additive
BOT	92	
EOT	90	
Baseline	210	

Amount of ULSD added
Amount of Mono added
Density of fuel
0.771
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	210	83		1.55	0	0.1
2	10	2271	82	0	1.7	50	0.2
3	30	2327	84	0	2.8	260	0.2
4	50	2552	77	0	3	240	0.2
5	70	2341	70	0	3.2	245	0.1
6	90	2292	97	0	3.3	235	0.1
7	110	2306	105	0	3.3	245	0.1
8	130	2253	105	0	3.3	265	0.2
9	150	2429	105	0	3.4	305	0.2

Average Water Content (ppm):	91
Time Weighted Average Water Removal Efficiency:	100.0
Water from Test Housing (mL):	1845
Water from Cleanup Filters (mL):	115

Actual Test Time (min)	150
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Average Upstream	2346.38
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Filter: FL12-1120, Kaydon A910162

Fuel: FL12-1164, 50/50 Tallow HEFA and JP-8

Vehicle: HMMWV

Table A-7. HMMWV SAE J1488 Results in Tallow HEFA and JP-8

**Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet**

Client:	US Army	Test Number:	16
Project Number:	100884	Filter ID:	FL12-1120
Test Engineer:	P. Canant	Test Date:	8/8/2012
Test Fluid:	FL12-1164	Test Fluid Flow Rate (LPM):	2.84
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	35.520	
EOT	37.802	

DSEP	Before Additive	After Additive
BOT	98	
EOT	98	
Baseline	168	

Amount of ULSD added
Amount of Mono added
Density of fuel
0.763
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	168	44		35.94	0	1.0
2	10	3446	39	0	37.03	0	1.0
3	30	3268	33	0	40.65	125	1.0
4	50	2781	39	0	41.06	130	1.5
5	70	3038	39	0	41.89	120	1.5
6	90	2681	107	0	42.66	110	1.5
7	110	2618	128	0	43.34	110	1.5
8	130	2917	128	0	43.88	122	1.5
9	150	2425	141	0	44.19	111	1.5

Average Water Content (ppm):	82
Time Weighted Average Water Removal Efficiency:	100.0
Water from Test Housing (mL):	828
Water from Cleanup Filters (mL):	0

Actual Test Time (min)	150
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Average Upstream	2896.75
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Filter: FL12-1235, Racor R90P2430

Fuel: FL12-1164, 50/50 Tallow HEFA and JP-8

Vehicle: Stryker

Table A-8. Stryker SAE J1488 Results in Tallow HEFA and JP-8

**Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet**

Client:	US Army	Test Number:	18
Project Number:	100884	Filter ID:	FL12-1235
Test Engineer:	P. Canant	Test Date:	8/29/2012
Test Fluid:	FL12-1164	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	36.450	
EOT	35.076	

DSEP	Before Additive	After Additive
BOT	96	
EOT	98	

Baseline 111

Amount of ULSD added
Amount of Mono added
Density of fuel
0.773
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	111	65		30.37	0	0.1
2	10	2407	121	10	30.99	7	0.1
3	30	2555	318	207	31.16	190	0.1
4	50	2473	528	417	31.64	204	0.1
5	70	2353	634	523	31.43	170	0.1
6	90	2503	739	628	31.89	177	0.1
7	110	2184	805	694	32.04	128	0.1
8	130	2183	868	757	33.03	123	0.1
9	150	2393	897	786	33.87	98	0.1

Average Water Content (ppm):	614
Time Weighted Average Water Removal Efficiency:	77.5
Water from Test Housing (mL):	1097
Water from Cleanup Filters (mL):	1050

Actual Test Time (min)	150
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Average Upstream	2381.38
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Drained Water Every 10mins
Residue noticed in water removed by clean up filters, filter had traces
of oil on inner and outer surfaces as received

Filter: FL12-1223, Racor 2020SM

Fuel: FL12-1164, 50/50 Tallow HEFA and JP-8

Vehicle: MRAP

Table A-9. MRAP SAE J1488 Results in Tallow HEFA and JP-8

Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet

Client:	US Army	Test Number:	17
Project Number:	100884	Filter ID:	FL12-1223
Test Engineer:	P. Canant	Test Date:	8/20/2012
Test Fluid:	FL12-1164	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	37.826	
EOT	35.245	

DSEP	Before Additive	After Additive
BOT	95	
EOT	97	
Baseline	194	

Amount of ULSD added
Amount of Mono added
Density of fuel
0.769
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	173	194		48.12	0	3.0
2	10	2475	90	0	48.12	50	3.0
3	30	2535	103	0	48.12	210	3.0
4	50	2513	86	0	48.12	250	3.0
5	70	2578	90	0	48.12	220	3.0
6	90	2546	101	0	48.12	225	3.0
7	110	2573	98	0	48.13	250	3.0
8	130	2374	86	0	48.13	250	3.0
9	150	2162	90	0	48.13	225	3.0

Average Water Content (ppm):	93
Time Weighted Average Water Removal Efficiency:	100.0
Water from Test Housing (mL):	1680
Water from Cleanup Filters (mL):	0

Actual Test Time (min)	150
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Average Upstream	2469.50
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Filter: FL12-1096, Fleetguard FS1000

Fuel: FL12-1164, 50/50 Tallow HEFA and JP-8

Vehicle: Bradley Fighting Vehicle

Table A-10. Bradley Fighting Vehicle SAE J1488 Results in Tallow HEFA and JP-8

**Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet**

Client:	US Army	Test Number:	15
Project Number:	100884	Filter ID:	FL12-1096
Test Engineer:	P. Canant	Test Date:	8/7/2012
Test Fluid:	FL12-1164	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	41.370	
EOT	35.520	

DSEP	Before Additive	After Additive
BOT	98	
EOT	98	
Baseline	177	

Amount of ULSD added
Amount of Mono added
Density of fuel
0.763
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	177	120		33.30	0	0.5
2	10	2372	112	0	32.79	7	0.5
3	30	2447	75	0	33.63	160	0.5
4	50	2386	58	0	33.87	210	1.0
5	70	2716	65	0	33.94	225	1.0
6	90	2669	61	0	34.16	225	1.0
7	110	2275	103	0	34.64	225	1.0
8	130	2537	43	0	35.41	180	1.0
9	150	2464	1485	1308	36.23	38	1.0

Average Water Content (ppm):	250
Time Weighted Average Water Removal Efficiency:	96.7
Water from Test Housing (mL):	1270
Water from Cleanup Filters (mL):	0

Actual Test Time (min)	150
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Average Upstream	2483.25
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Filter: FL12-1205, Fleetguard FF5369W

Fuel: FL12-1164, 50/50 Tallow HEFA and JP-8

Vehicle: Heavy Tactical Vehicle

Table A-11. Heavy Tactical VehicleSAE J1488 Results in Tallow HEFA and JP-8

Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet

Client:	US Army	Test Number:	14
Project Number:	100884	Filter ID:	FL12-1205
Test Engineer:	P. Canant	Test Date:	8/1/2012
Test Fluid:	FL12-1164	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	43.522	
EOT	41.370	

DSEP	Before Additive	After Additive
BOT	98	
EOT	98	
Baseline	183	

Amount of ULSD added
Amount of Mono added
Density of fuel
0.763
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	183	123		30.41	0	0.1
2	10	2563	185	2	30.68	12	0.1
3	30	2743	212	29	30.95	220	0.1
4	50	2342	181	0	31.06	225	0.1
5	70	2236	241	58	31.20	225	0.1
6	90	2285	224	41	30.99	250	0.1
7	110	2812	176	0	31.66	225	0.1
8	130	2350	213	30	31.81	225	0.1
9	150	2231	143	0	31.84	250	0.1

Average Water Content (ppm):	197
Time Weighted Average Water Removal Efficiency:	99.4
Water from Test Housing (mL):	1632
Water from Cleanup Filters (mL):	0

Actual Test Time (min)	150
------------------------	-----

Average Upstream	2445.25
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Filter: FL12-1118, Kaydon A910162

Fuel: FL12-1139, 50/50 IPK and JP-8

Vehicle: HMMWV

Table A-12. HMMWV SAE J1488 Results in IPK and JP-8

Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet

Client:	U.S. Army	Test Number:	10
Project Number:	100884	Filter ID:	FL12-1118
Test Engineer:	P. Canant	Test Date:	7/23/2012
Test Fluid:	FL12-1139	Test Fluid Flow Rate (LPM):	2.84
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	41.863	
EOT	40.076	

DSEP	Before Additive	After Additive
BOT	98	
EOT	99	
Baseline	145	

Amount of ULSD added
Amount of Mono added
Density of fuel
0.765
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	145	73		36.06	0	1.0
2	10	2579	40	0	39.56	16	1.5
3	30	2266	73	0	40.49	146	2.0
4	50	2759	46	0	40.70	121	2.0
5	70	2863	6	0	40.89	152	2.0
6	90	2791	56	0	41.16	135	2.0
7	110	2932	39	0	41.88	147	2.0
8	130	2793	47	0	42.06	143	2.0
9	150	2688	118	0	42.77	120	2.0

Average Water Content (ppm):	53
Time Weighted Average Water Removal Efficiency:	100.0
Water from Test Housing (mL):	980
Water from Cleanup Filters (mL):	0

Actual Test Time (min)	150
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Average Upstream	2708.88
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Filter: FL12-1236, Racor R90P2430

Fuel: FL12-1139, 50/50 IPK and JP-8

Vehicle: Stryker

Table A-13. Stryker SAE J1488 Results in IPK and JP-8

Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet

Client:	US Army	Test Number:	19
Project Number:	100884	Filter ID:	FL12-1236
Test Engineer:	P. Canant	Test Date:	10/22/2012
Test Fluid:	FL12-1139	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	36.324	
EOT	38.017	

DSEP	Before Additive	After Additive
BOT	100	
EOT	95	

Baseline 137

Amount of ULSD added
Amount of Mono added
Density of fuel
0.777
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	65	137		3.3	0	0
2	10	2284	60	0	4	5	0.1
3	30	2670	131	0	4.2	205	0.1
4	50	2216	350	213	4.5	200	0.1
5	70	2346	687	550	4.7	205	0.1
6	90	2357	917	780	4.7	140	0.1
7	110	2902	1451	1314	5.1	150	0.1
8	130	2344	1107	970	5.5	110	0.1
9	150	3153	1585	1448	5.5	100	0.2

Average Water Content (ppm):	786
Time Weighted Average Water Removal Efficiency:	72.5
Water from Test Housing (mL):	1115
Water from Cleanup Filters (mL):	815

Actual Test Time (min)	150
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Average Upstream	2534.00
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Filter: FL12-1194, Racor 2020SM

Fuel: FL12-1139, 50/50 IPK and JP-8

Vehicle: MRAP

Table A-14. MRAP SAE J1488 Results in IPK and JP-8

Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet

Client:	US Army	Test Number:	12
Project Number:	100884	Filter ID:	FL12-1194
Test Engineer:	P. Canant	Test Date:	7/30/2012
Test Fluid:	FL12-1139	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	38.604	
EOT	37.540	

DSEP	Before Additive	After Additive
BOT	98	
EOT	97	

Baseline 125

Amount of ULSD added
Amount of Mono added
Density of fuel
0.765
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	125	104		48.12	0	3.0
2	10	2312	107	0	48.12	0	3.0
3	30	2418	72	0	48.12	230	3.0
4	50	2448	66	0	48.12	230	3.0
5	70	2775	85	0	48.12	200	3.0
6	90	3572	64	0	48.12	225	3.0
7	110	2375	60	0	48.12	210	3.0
8	130	2250	39	0	48.13	220	3.0
9	150	2263	60	0	48.13	210	3.0

Average Water Content (ppm):	69
Time Weighted Average Water Removal Efficiency:	100.0
Water from Test Housing (mL):	1525
Water from Cleanup Filters (mL):	0

Actual Test Time (min)	150
------------------------	-----

Average Upstream	2551.63
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Filter: FL12-1095, Fleetguard FS1000

Fuel: FL12-1139, 50/50 IPK and JP-8

Vehicle: Bradley Fighting Vehicle

Table A-15. Bradley Fighting Vehicle SAE J1488 Results in IPK and JP-8

Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet

Client:	U.S. Army	Test Number:	11
Project Number:	100884	Filter ID:	FL12-1095
Test Engineer:	P. Canant	Test Date:	7/24/2012
Test Fluid:	FL12-1139	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	40.076	
EOT	38.604	

DSEP	Before Additive	After Additive
BOT	99	
EOT	98	

Baseline 149

Amount of ULSD added
Amount of Mono added
Density of fuel
0.765
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	149	86		31.72	0	0.1
2	10	2767	64	0	32.15	200	0.1
3	30	2926	78	0	33.10	250	0.1
4	50	2546	47	0	33.17	250	0.1
5	70	2372	142	0	33.98	250	0.1
6	90	2745	94	0	34.01	275	0.1
7	110	2237	144	0	34.78	275	0.1
8	130	2716	149	0	34.99	225	0.1
9	150	2199	116	0	35.15	275	0.1

Average Water Content (ppm):	104
Time Weighted Average Water Removal Efficiency:	100.0
Water from Test Housing (mL):	2000
Water from Cleanup Filters (mL):	0

Actual Test Time (min)	150
------------------------	-----

Average Upstream	2563.50
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Filter: FL12-1204, Fleetguard FF5369W

Fuel: FL12-1139, 50/50 IPK and JP-8

Vehicle: Heavy Tactical Vehicle

Table A-16. Heavy Tactical VehicleSAE J1488 Results in IPK and JP-8

Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet

Client:	US Army	Test Number:	13
Project Number:	100884	Filter ID:	FL12-1204
Test Engineer:	P. Canant	Test Date:	7/31/2012
Test Fluid:	FL12-1139	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	37.540	
EOT	32.602	

DSEP	Before Additive	After Additive
BOT	97	
EOT	95	
Baseline	163	

Amount of ULSD added
Amount of Mono added
Density of fuel
0.765
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	163	64		29.82	0	0.1
2	10	2380	108	0	30.11	9	0.1
3	30	2890	52	0	30.38	250	0.1
4	50	2669	141	0	30.39	250	0.1
5	70	2616	139	0	30.11	250	0.1
6	90	2835	166	3	30.61	280	0.1
7	110	2397	138	0	30.72	225	0.1
8	130	2570	99	0	30.77	250	0.1
9	150	2614	142	0	31.04	200	0.1

Average Water Content (ppm):	123
Time Weighted Average Water Removal Efficiency:	100.0
Water from Test Housing (mL):	1714
Water from Cleanup Filters (mL):	0

Actual Test Time (min)	150
------------------------	-----

Average Upstream	2621.38
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Filter: FL12-1111, Kaydon A910162

Fuel: FL12-1141, 50/50 Camelina HEFA and JP-8

Vehicle: HMMWV

Table A-17. HMMWV SAE J1488 Results in Camelina HEFA and JP-8

**Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet**

Client:	U.S. ARMY	Test Number:	6
Project Number:	100884	Filter ID:	FL12-1111
Test Engineer:	P. Canant	Test Date:	7/11/2012
Test Fluid:	FL12-1141	Test Fluid Flow Rate (LPM):	2.84
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	34.379	
EOT	34.377	

DSEP	Before Additive	After Additive
BOT	97	
EOT	95	

Baseline	225
-----------------	-----

Amount of ULSD added
Amount of Mono added
Density of fuel
0.761
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	225	51		7.48	0	0.5
2	10	2793	86	0	8.70	0	1.0
3	30	2265	32	0	10.22	86	1.0
4	50	2239	70	0	10.62	127	1.0
5	70	2573	46	0	11.70	96	1.0
6	90	2725	93	0	11.86	121	1.5
7	110	2736	33	0	12.29	110	1.5
8	130	2372	46	0	12.70	116	1.5
9	150	3046	45	0	12.94	123	1.5

**Drained Every
10 minutes**

Average Water Content (ppm):	56
Time Weighted Average Water Removal Efficiency:	100.0
Water from Test Housing (mL):	779
Water from Cleanup Filters (mL):	0

Actual Test Time (min)	150
Average Upstream	2593.63

Filter: FL12-1240, Racor R90P2430

Fuel: FL12-1141, 50/50 Camelina HEFA and JP-8

Vehicle: Stryker

Table A-18. Stryker SAE J1488 Results in Camelina HEFA and JP-8

**Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet**

Client:	US Army	Test Number:	25
Project Number:	100884	Filter ID:	FL-12-1240
Test Engineer:	P. Canant	Test Date:	10/31/2012
Test Fluid:	FL12-1141	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	36.883	-
EOT	39.776	-

DSEP	Before Additive	After Additive
BOT	83	-
EOT	90	-
Baseline	123	

Amount of ULSD added
-
Amount of Mono added
-
Density of fuel
0.767
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	123	100		3.5	0	0.1
2	10	2709	119	0	4.7	25	0.1
3	30	2588	222	99	3.7	225	0.1
4	50	3161	411	288	5.1	295	0.2
5	70	2764	573	450	5.4	210	0.2
6	90	2905	583	460	5.3	200	0.2
7	110	2668	551	428	5.4	175	0.2
8	130	2607	885	762	4.1	150	0.2
9	150	2363	494	371	5.5	145	0.2

Average Water Content (ppm):	480
Time Weighted Average Water Removal Efficiency:	86.0
Water from Test Housing (mL):	1425
Water from Cleanup Filters (mL):	110

Actual Test Time (min)	150
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Average Upstream	2720.63
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Filter: FL12-1168, Racor 2020SM

Fuel: FL12-1141, 50/50 Camelina HEFA and JP-8

Vehicle: MRAP

Table A-19. MRAP SAE J1488 Results in Camelina HEFA and JP-8

**Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet**

Client:	U.S. Army	Test Number:	5
Project Number:	100884	Filter ID:	FL12-1168
Test Engineer:	P. Canant	Test Date:	7/10/2012
Test Fluid:	FL12-1141	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	35.957	
EOT	34.370	

DSEP	Before Additive	After Additive
BOT	98	
EOT	97	

Baseline 112

Amount of ULSD added
Amount of Mono added
Density of fuel
0.761
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	112	49		20.66	0	2.5
2	10	2933	64	0	20.90	64	2.5
3	30	2632	25	0	21.95	243	2.5
4	50	2762	66	0	22.54	270	2.5
5	70	2394	47	0	22.42	262	2.5
6	90	2625	56	0	22.74	270	2.5
7	110	2577	39	0	22.54	255	2.5
8	130	2571	47	0	22.65	296	2.5
9	150	2805	39	0	22.81	265	3.0

Average Water Content (ppm):	48
Time Weighted Average Water Removal Efficiency:	100.0
Water from Test Housing (mL):	1925
Water from Cleanup Filters (mL):	50

Actual Test Time (min)	150
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Average Upstream	2662.38
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Filter: FL12-1094, Fleetguard FS1000

Fuel: FL12-1141, 50/50 Camelina HEFA and JP-8

Vehicle: Bradley Fighting Vehicle

Table A-20. Bradley Fighting Vehicle SAE J1488 Results in Camelina HEFA and JP-8

Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet

Client:	U.S. Army	Test Number:	4
Project Number:	100884	Filter ID:	FL12-1094
Test Engineer:	P.Canant	Test Date:	7/10/2012
Test Fluid:	FL12-1141	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	37.847	
EOT	35.957	

DSEP	Before Additive	After Additive
BOT	97	
EOT	98	

Baseline 188

Amount of ULSD added
Amount of Mono added
Density of fuel
0.761
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	188	142		5.02	0	0.5
2	10	3156	198	10	5.12	7	0.1
3	30	2806	84	0	5.93	240	0.1
4	50	2464	32	0	6.06	225	0.1
5	70	2291	86	0	6.12	235	0.1
6	90	2416	66	0	6.54	254	0.1
7	110	2479	66	0	6.79	276	0.1
8	130	2490	47	0	7.24	277	0.1
9	150	2467	60	0	7.57	240	0.5

Average Water Content (ppm):	80
Time Weighted Average Water Removal Efficiency:	100.0
Water from Test Housing (mL):	1754
Water from Cleanup Filters (mL):	0

Actual Test Time (min)	150
------------------------	-----

Average Upstream	2571.13
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Filter: FL12-1206, Fleetguard FF5369W

Fuel: FL12-1141, 50/50 Camelina HEFA and JP-8

Vehicle: Heavy Tactical Vehicle

Table A-21. Heavy Tactical VehicleSAE J1488 Results in Camelina HEFA and JP-8

Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet

Client:	US Army	Test Number:	24
Project Number:	100884	Filter ID:	FL12-1206
Test Engineer:	P. Canant	Test Date:	10/30/2012
Test Fluid:	FL12-1141	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	38.523	-
EOT	37.218	-

DSEP	Before Additive	After Additive
BOT	84	-
EOT	89	-
Baseline	191	

Amount of ULSD added
-
Amount of Mono added
-
Density of fuel
0.7683
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	191	72	0	1.3	0	0
2	10	2637	78	0	1.3	50	0
3	30	2665	86	0	1.4	265	0
4	50	2770	53	0	1.5	270	0
5	70	2343	73	0	1.6	245	0.1
6	90	2932	73	0	1.5	280	0.1
7	110	2493	59	0	2.2	265	0.1
8	130	2731	63	0	2.4	267	0.1
9	150	2281	61	0	2.4	270	0.1

Average Water Content (ppm):	68
Time Weighted Average Water Removal Efficiency:	100.0
Water from Test Housing (mL):	1912
Water from Cleanup Filters (mL):	45

Actual Test Time (min)	150
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Average Upstream	2606.50
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Filter: FL12-1116, Kaydon A910162

Fuel: FL12-1140, 50/50 SPK and JP-8

Vehicle: HMMWV

Table A-22. HMMWV SAE J1488 Results in SPK and JP-8

**Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet**

Client:	U.S. Army	Test Number:	9
Project Number:	100884	Filter ID:	FL12-1116
Test Engineer:	P. Canant	Test Date:	4/16/2012
Test Fluid:	FL12-1140	Test Fluid Flow Rate (LPM):	2.84
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	37.259	
EOT	34.755	

Amount of ULSD added
Amount of Mono added
Density of fuel
0.762
Density of water
0.998

DSEP	Before Additive	After Additive
BOT	96	
EOT	99	

Baseline	161	Drained Every 10 minutes					
Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	161	88		15.37	0	2.0
2	10	1997	71	0	44.36	33	2.5
3	30	2460	1511	1350	45.45	105	2.5
4	50	2834	70	0	43.22	124	2.0
5	70	2610	101	0	43.54	127	2.0
6	90	2350	65	0	44.42	111	2.0
7	110	2681	98	0	43.98	125	2.0
8	130	2532	50	0	44.31	124	2.0
9	150	2684	33	0	45.4	106	2.0

Average Water Content (ppm):	250
Time Weighted Average Water Removal Efficiency:	96.0
Water from Test Housing (mL):	855
Water from Cleanup Filters (mL):	100

Actual Test Time (min)	150
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Average Upstream	2518.50
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Filter: FL12-1238, Racor R90P2430

Fuel: FL12-1140, 50/50 SPK and JP-8

Vehicle: Stryker

Table A-23. Stryker SAE J1488 Results in SPK and JP-8

Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet

Client:	US Army	Test Number:	22
Project Number:	100884	Filter ID:	FL12-1238
Test Engineer:	P. Canant	Test Date:	10/24/2012
Test Fluid:	FL12-1140	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	38.117	
EOT	38.504	

DSEP	Before Additive	After Additive
BOT	100	
EOT	99	

Baseline 196

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	196	94		3.31	0	0.1
2	10	2436	144	0	3.60	5	0.1
3	30	2510	156	0	4.37	256	0.1
4	50	2736	193	0	4.82	289	0.1
5	70	2723	182	0	4.64	258	0.1
6	90	3168	158	0	4.9	250	0.1
7	110	2575	182	0	4.9	274	0.1
8	130	2572	159	0	5.1	270	0.2
9	150	2756	199	3	5.2		0.1

Amount of ULSD added
Amount of Mono added
Density of fuel
0.757
Density of water
0.998

Average Water Content (ppm):	172
Time Weighted Average Water Removal Efficiency:	100.0
Water from Test Housing (mL):	1602
Water from Cleanup Filters (mL):	160

Actual Test Time (min)	150
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Average Upstream	2684.50
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Filter: FL12-1172, Racor 2020SM

Fuel: FL12-1140, 50/50 SPK and JP-8

Vehicle: MRAP

Table A-24. MRAP SAE J1488 Results in SPK and JP-8

Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet

Client:	U.S. Army	Test Number:	8
Project Number:	100884	Filter ID:	FL12-1172
Test Engineer:	P. Canant	Test Date:	7/13/2012
Test Fluid:	FL12-1140	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	36.867	
EOT	37.259	

DSEP	Before Additive	After Additive
BOT	98	
EOT	96	

Baseline	223	
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Amount of ULSD added

--

Amount of Mono added

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Density of fuel

0.762

Density of water

0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	223	57		22.21	0	2.5
2	10	2698	101	0	21.28	30	2.5
3	30	2570	59	0	22.34	272	2.5
4	50	2348	96	0	22.64	272	2.5
5	70	2387	60	0	22.81	258	2.5
6	90	2428	52	0	21.47	206	2.5
7	110	2445	60	0	22.43	278	2.5
8	130	3005	80	0	21.57	285	2.5
9	150	2453	76	0	22.12	310	2.5

Average Water Content (ppm):	73
Time Weighted Average Water Removal Efficiency:	100.0
Water from Test Housing (mL):	1911
Water from Cleanup Filters (mL):	0

Actual Test Time (min)	150
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Average Upstream	2541.75
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Filter: FL12-1093, Fleetguard FS1000

Fuel: FL12-1140, 50/50 SPK and JP-8

Vehicle: Bradley Fighting Vehicle

Table A-25. Bradley Fighting Vehicle SAE J1488 Results in SPK and JP-8

Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet

Client:	U.S. Army	Test Number:	7
Project Number:	100884	Filter ID:	FL12-1093
Test Engineer:	P. Canant	Test Date:	7/12/2012
Test Fluid:	FL12-1140	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	37.190	
EOT	36.867	

DSEP	Before Additive	After Additive
BOT	97	
EOT	98	
Baseline	197	

Amount of ULSD added
Amount of Mono added
Density of fuel
0.762
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	197	26		6.01	0	0.5
2	10	2866	113	0	5.51	0	0.5
3	30	2633	58	0	5.11	243	0.1
4	50	2567	33	0	5.48	215	0.1
5	70	2515	67	0	5.62	203	0.1
6	90	2559	65	0	5.78	255	0.1
7	110	2663	53	0	6.25	263	0.1
8	130	2692	58	0	6.81	272	0.5
9	150	2287	71	0	7.01	295	0.5

Average Water Content (ppm):	65
Time Weighted Average Water Removal Efficiency:	100.0
Water from Test Housing (mL):	1746
Water from Cleanup Filters (mL):	0

Actual Test Time (min)	150
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Average Upstream	2597.75
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Filter: FL12-1207, Fleetguard FF5369W

Fuel: FL12-1140, 50/50 SPK and JP-8

Vehicle: Heavy Tactical Vehicle

Table A-26. Heavy Tactical VehicleSAE J1488 Results in SPK and JP-8

**Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet**

Client:	US Army	Test Number:	23
Project Number:	100884	Filter ID:	FL12-1207
Test Engineer:	P. Canant	Test Date:	10/24/2012
Test Fluid:	FL12-1140	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	38.422	
EOT	39.89	

	Before Additive	After Additive
DSEP		
BOT	95	
EOT	100	
Baseline	72	

Amount of ULSD added
Amount of Mono added
Density of fuel
0.763
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	72	72		3.1	0	0
2	10	2419	60	0	3.1	1	0.1
3	30	2734	59	0	3.2	300	0.1
4	50	2933	86	14	3.3	300	0.1
5	70	2399	101	29	3.2	320	0
6	90	3073	74	2	3.1	290	0
7	110	2744	105	33	3.1	275	0
8	130	2768	93	21	3.1	315	0.1
9	150	2612	81	9	3.2	260	0.1

Average Water Content (ppm):	82
Time Weighted Average Water Removal Efficiency:	99.6
Water from Test Housing (mL):	2061
Water from Cleanup Filters (mL):	375

Actual Test Time (min)	150
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Average Upstream	2710.25
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Filter: FL12-1113, Kaydon A910162

Fuel: Ultra Low Sulfur Diesel Fuel with Mono-olein

Vehicle: HMMWV

Table A-27. HMMWV SAE J1488 Results in ULSD with Mono-olein

**Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet**

Client:	US Army	Test Number:	30
Project Number:	100884	Filter ID:	FL12-1113
Test Engineer:	P. Canant	Test Date:	11/7/2012
Test Fluid:	ULSD+Mono	Test Fluid Flow Rate (LPM):	2.8
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	26.921	12.36
EOT	-	16.718

	Before Additive	After Additive
DSEP		
BOT	95	0
EOT	-	64

Baseline	188
-----------------	-----

Amount of ULSD added

--

Amount of Mono added

150

Density of fuel

0.814

Density of water

0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	188	103		15.3	0	2.50
2	10	2536	948	760	24.4	10	4.00
3	30	2764	948	760	26.6	60	4.00
4	50	2976	851	663	28.2	125	4.50
5	70	2452	2051	1863	29.5	115	4.00
6	90	2680	464	276	29.9	120	4.00
7	110	2481	859	671	30.4	110	4.00
8	130	2829	563	375	30.9	100	4.00
9	150	2408	2019	1831	29.8	120	4.00

Average Water Content (ppm):	1088
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Time Weighted Average Water Removal Efficiency:	65.6
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Water from Test Housing (mL):	760
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Water from Cleanup Filters (mL):	3200
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Actual Test Time (min)	150
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Average Upstream	2640.75
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Filter: FL12-1269, Racor R90P2430

Fuel: Ultra Low Sulfur Diesel Fuel with Mono-olein

Vehicle: Stryker

Table A-28. Stryker SAE J1488 Results in ULSD with Mono-olein

Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet

Client:	US Army	Test Number:	27
Project Number:	100884	Filter ID:	FL12-1269
Test Engineer:	P. Canant	Test Date:	11/2/2012
Test Fluid:	ULSD + Mono	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	27.123	14.605
EOT	-	15.408

	Before Additive	After Additive
DSEP		
BOT	95	0
EOT	-	0

Baseline 123

Amount of ULSD added
-
Amount of Mono added
180
Density of fuel
0.778
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	71	75		2.7	0	0.1
2	10	3098	2678	2555	3.1	0	0.2
3	30	2665	2446	2323	3.3	0	0.3
4	50	2743	2621	2498	4.2	0	1
5	70			0			
6	90			0			
7	110			0			
8	130			0			
9	150			0			

Average Water Content (ppm):	2582
Time Weighted Average Water Removal Efficiency:	14.0
Water from Test Housing (mL):	
Water from Cleanup Filters (mL):	1800

Actual Test Time (min)	50
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Average Upstream	2835.33
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Filter: FL12-1270, Racor 2020SM

Fuel: Ultra Low Sulfur Diesel Fuel with Mono-olein

Vehicle: MRAP

Table A-29. MRAP SAE J1488 Results in ULSD with Mono-olein

Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet

Client:	US Army	Test Number:	26
Project Number:	100884	Filter ID:	FL12-1270
Test Engineer:	P. Canant	Test Date:	11/1/2012
Test Fluid:	ULSD+Mono	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	35.689	14.645
EOT		16.307

DSEP	Before Additive	After Additive
BOT	96	0
EOT		0

Baseline	108
-----------------	-----

Amount of ULSD added
Amount of Mono added
200 mL
Density of fuel
0.815
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	108	63		25.70	0	3.0
2	10	2913	458	350	28.61	0	4.0
3	30	2732	2281	2173	37.02	0	6.0
4	50	2697	2183	2075	36.51	0	5.0
5	70	2760	2077	1969	36.98	0	5.0
6	90	2616	1995	1887	36.31	25	5.0
7	110	2619	1516	1408	36.43	30	4.5
8	130	2479	1942	1834	36.00	40	4.5
9	150	2648	1762	1654	36.05	30	4.5

Average Water Content (ppm):	1777
Time Weighted Average Water Removal Efficiency:	34.5
Water from Test Housing (mL):	125
Water from Cleanup Filters (mL):	1040

Actual Test Time (min)	150
-------------------------------	-----

Average Upstream	2683.00
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Filter: FL12-1097, Fleetguard FS1000

Fuel: Ultra Low Sulfur Diesel Fuel with Mono-olein

Vehicle: Bradley Fighting Vehicle

Table A-30. Bradley Fighting Vehicle SAE J1488 Results in ULSD with Mono-olein

Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet

Client:	US Army	Test Number:	29
Project Number:	100884	Filter ID:	FL12-1097
Test Engineer:	P. Canant	Test Date:	11/6/2012
Test Fluid:	ULSD + Mono	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	28.825	15.688
EOT	-	16.924

DSEP	Before Additive	After Additive
BOT	92	0
EOT	-	0

Baseline	71
-----------------	----

Amount of ULSD added
Amount of Mono added
170
Density of fuel
0.814
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	61	71		3.5	0	0.6
2	10	2075	712	641	5.7	0	1.0
3	30	2366	1544	1473	8.1	0	1.5
4	50	2610	2004	1933	9.5	0	1.5
5	70	2198	1892	1821	9.1	0	1.6
6	90	2617	2814	2743	9.5	0	1.7
7	110	1938	2150	2079	9.8	0	2
8	130	3710	4287	4216	10.9	0	2
9	150			0			

Average Water Content (ppm):	2200
Time Weighted Average Water Removal Efficiency:	10.3
Water from Test Housing (mL):	0
Water from Cleanup Filters (mL):	3300

Actual Test Time (min)	130
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Average Upstream	2502.00
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Filter: FL12-1264, Fleetguard FF5369W

Fuel: Ultra Low Sulfur Diesel Fuel with Mono-olein

Vehicle: Heavy Tactical Vehicle

Table A-31. Heavy Tactical VehicleSAE J1488 Results in ULSD with Mono-olein

Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet

Client:	US Army	Test Number:	28
Project Number:	100884	Filter ID:	FL12-1264
Test Engineer:	P. Canant	Test Date:	11/5/2012
Test Fluid:	ULSD + Mono	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	31.68	15.7
EOT	-	16.712

DSEP	Before Additive	After Additive
BOT	98	0
EOT	-	0
Baseline	89	

Amount of ULSD added
Amount of Mono added
185
Density of fuel
0.814
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	89	80		1.30	0	0.1
2	10	2996	841	752	1.50	0	0.1
3	30	2966	2222	2133	1.60	10	0.1
4	50	2482	2071	1982	1.80	50	0.3
5	70	2827	1463	1374	2.68	75	0.5
6	90	2766	1594	1505	2.91	55	0.1
7	110	2777	1575	1486	3.07	70	0.1
8	130	2539	1341	1252	2.97	60	0.1
9	150	2517	1654	1565	2.90	65	0.1

Average Water Content (ppm):	1595
Time Weighted Average Water Removal Efficiency:	43.1
Water from Test Housing (mL):	385
Water from Cleanup Filters (mL):	2900

Actual Test Time (min)	150
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Average Upstream	2733.75
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Filter: FL13-1312, Racor 490P30, Commercial Equivalent Filter

Fuel: FL12-1139, 50/50 Blend of IPK and JP-8

Vehicle: Stryker

Table A-32. Additional Stryker (Commercial) SAE J1488 Results in IPK and JP-8

Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet

Client:	U.S. Army	Test Number:	2
Project Number:	100948	Filter ID:	FL13-1312
Test Engineer:	P. Canant	Test Date:	1/17/2013
Test Fluid:	FL12-1139	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	PRES.

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	35.8	N/A
EOT	35.9	N/A

DSEP	Before Additive	After Additive
BOT	99	N/A
EOT	99	N/A

Baseline 102

Amount of ULSD added
N/A
Amount of Mono added
N/A
Density of fuel
0.774
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	97	102		4.8	0	0.7
2	10	2449	137	35	5.5	228	0.8
3	30	2681	115	13	2.1	488	0.3
4	50	2257	134	32	5.5	475	0.8
5	70	2869	102	0	6.2	425	0.9
6	90	3048	160	58	6.2	475	0.9
7	110	2442	148	46	6.2	415	0.9
8	130	2520	185	83	6.2	427	0.9
9	150	1956	204	102	6.2	400	0.9

Average Water Content (ppm):	148
Time Weighted Average Water Removal Efficiency:	98.1
Water from Test Housing (mL):	3333
Water from Cleanup Filters (mL):	4157

Actual Test Time (min)	150
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Average Upstream	2527.75
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Filter: FL13-1315, Racor 400R-GDLS-01 (S3226P), Government Specification Filter

Fuel: FL12-1139, 50/50 Blend of IPK and JP-8

Vehicle: Stryker

Table A-33. Additional Stryker (Government) SAE J1488 Results in IPK and JP-8

**Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet**

Client:	U.S. Army	Test Number:	1
Project Number:	100948	Filter ID:	FL13-1315
Test Engineer:	P. Canant	Test Date:	1/17/2013
Test Fluid:	FL12-1139	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	PRES.

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	36.1	N/A
EOT	35.8	N/A

	Before Additive	After Additive
DSEP		
BOT	100	N/A
EOT	99	N/A

Baseline 97

Amount of ULSD added
N/A
Amount of Mono added
N/A
Density of fuel
0.774
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	85	97		1.4	0	0.2
2	10	1712	128	31	2.8	15	0.4
3	30	2938	235	138	3.4	228	0.5
4	50	2187	416	319	4.8	450	0.7
5	70	2148	540	443	5.5	476	0.8
6	90	2402	396	299	4.8	879	0.7
7	110	2401	425	328	6.2	701	0.9
8	130	2848	762	665	6.2	548	0.9
9	150	2646	497	400	6.2	380	0.9

Average Water Content (ppm):	425
Time Weighted Average Water Removal Efficiency:	85.6
Water from Test Housing (mL):	3677
Water from Cleanup Filters (mL):	7464

Actual Test Time (min)	150
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Average Upstream	2410.25
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Filter: FL13-1311, Racor 490P30, Commercial Equivalent Filter

Fuel: FL12-1138, 50/50 R-8 and JP-8

Vehicle: Stryker

Table A-34. Additional Stryker (Commercial) SAE J1488 Results in R-8 and JP-8

Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet

Client:	U.S. Army	Test Number:	4
Project Number:	100948	Filter ID:	FL13-1311
Test Engineer:	P. Canant	Test Date:	1/18/2013
Test Fluid:	FL12-1138	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	PRES.

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	44.41	N/A
EOT	44.36	N/A

DSEP	Before Additive	After Additive
BOT	99	N/A
EOT	99	N/A

Baseline 99

Amount of ULSD added
N/A
Amount of Mono added
N/A
Density of fuel
0.774
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	63	99		4.1	0	0.6
2	10	1946	105	6	2.1	70	0.3
3	30	1891	155	56	4.8	240	0.7
4	50	2467	285	186	4.8	150	0.7
5	70	2535	400	301	4.8	198	0.7
6	90	2826	708	609	5.5	168	0.8
7	110	2636	950	851	5.5	98	0.8
8	130	2547	1098	999	5.5	70	0.8
9	150	2807	995	896	2.1	52	0.3

Average Water Content (ppm):	587
Time Weighted Average Water Removal Efficiency:	78.8
Water from Test Housing (mL):	1046
Water from Cleanup Filters (mL):	5920

Actual Test Time (min)	150
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Average Upstream	2456.88
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Filter: FL13-1319, Racor 400R-GDLS-01 (S3226P), Government Specification Filter

Fuel: FL12-1138, 50/50 R-8 and JP-8

Vehicle: Stryker

Table A-35. Additional Stryker (Government) SAE J1488 Results in R-8 and JP-8

**Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet**

Client:	U.S. Army	Test Number:	3
Project Number:	100948	Filter ID:	FL13-1319
Test Engineer:	P. Canant	Test Date:	1/18/2013
Test Fluid:	FL12-1138	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	PRES.

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	44.24	N/A
EOT	44.41	N/A

	Before Additive	After Additive
DSEP		
BOT	100	N/A
EOT	99	N/A

Baseline 98

Amount of ULSD added
N/A
Amount of Mono added
N/A
Density of fuel
0.774
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	64	98		4.1	0	0.6
2	10	2596	226	128	5.5	210	0.8
3	30	2506	230	132	5.5	452	0.8
4	50	2470	133	35	5.5	578	0.8
5	70	2108	105	7	5.5	432	0.8
6	90	3087	159	61	4.8	310	0.7
7	110	2603	170	72	4.8	460	0.7
8	130	2324	153	55	4.8	240	0.7
9	150	2414	157	59	4.8	330	0.7

Average Water Content (ppm):	167
Time Weighted Average Water Removal Efficiency:	97.4
Water from Test Housing (mL):	3012
Water from Cleanup Filters (mL):	5679

Actual Test Time (min)	150
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Average Upstream	2513.50
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Filter: FL13-1308, Racor 490P30, Commercial Equivalent Filter

Fuel: FL12-1164, 50/50 Blend of Tallow HEFA and JP-8

Vehicle: Stryker

Table A-36. Additional Stryker (Commercial) SAE J1488 Results in Tallow HEFA and JP-8

Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet

Client:	U.S. Army	Test Number:	6
Project Number:	100948	Filter ID:	FL13-1308
Test Engineer:	P. Canant	Test Date:	2/1/2013
Test Fluid:	FL12-1164	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	42.006	
EOT	41.428	

	Before Additive	After Additive
DSEP		
BOT	96	
EOT	100	
Baseline	71	

Amount of ULSD added
Amount of Mono added
Density of fuel
0.765
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	66	71		3.4	0	0.5
2	10	2577	65	0	3.4	100	0.5
3	30	2833	373	302	3.4	400	0.5
4	50	2934	782	711	3.4	325	0.5
5	70	2582	1281	1210	3.4	225	0.5
6	90	2842	1705	1634	3.4	160	0.5
7	110	2684	1940	1869	6.9	100	1.0
8	130	2682	1654	1583	3.4	80	0.5
9	150	2542	1634	1563	6.9	110	1.0

Average Water Content (ppm):	1179
Time Weighted Average Water Removal Efficiency:	56.4
Water from Test Housing (mL):	1500
Water from Cleanup Filters (mL):	7600

Actual Test Time (min)	150
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Average Upstream	2709.50
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Filter: FL13-1314, Racor 400R-GDLS-01 (S3226P), Government Specification Filter

Fuel: FL12-1164, 50/50 Blend of Tallow HEFA and JP-8

Vehicle: Stryker

Table A-37. Additional Stryker (Government) SAE J1488 Results in Tallow HEFA and JP-8

Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet

Client:	U.S. Army	Test Number:	5
Project Number:	100948	Filter ID:	FL13-1314
Test Engineer:	P. Canant	Test Date:	1/23/2013
Test Fluid:	FL12-1164	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	41.877	
EOT	43.552	

	Before Additive	After Additive
DSEP		
BOT	94	
EOT	98	
Baseline	67	

Amount of ULSD added
Amount of Mono added
Density of fuel
0.765
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	67	65		6.9	0	1.0
2	10	2096	460	393	6.9	45	1.0
3	30	1931	459	392	6.9	200	1.0
4	50	1975	526	459	6.9	200	1.0
5	70	2733	581	514	6.9	275	1.0
6	90	3025	467	400	6.9	350	1.0
7	110	2122	455	388	6.9	550	1.0
8	130	3086	641	574	6.9	600	1.0
9	150	3540	604	537	6.9	950	1.0

Average Water Content (ppm):	524
Time Weighted Average Water Removal Efficiency:	82.0
Water from Test Housing (mL):	3170
Water from Cleanup Filters (mL):	5100

Actual Test Time (min)	150
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Average Upstream	2563.50
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UNCLASSIFIED

Filter: FL13-1309, Racor 490P30, Commercial equivalent filter

Fuel: FL12-1141, 50/50 Blend of Camelina HEFA and JP-8

Vehicle: Stryker

Table A-38. Additional Stryker (Commercial) SAE J1488 Results in Camelina HEFA and JP-8

**Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet**

Client:	U.S. Army	Test Number:	8
Project Number:	100948	Filter ID:	FL3-1309
Test Engineer:	P. Canant	Test Date:	2/12/2013
Test Fluid:	FL12-1141	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	43.577	
EOT	43.936	

	Before Additive	After Additive
DSEP		
BOT	99	
EOT	99	
Baseline	66	

Amount of ULSD added
Amount of Mono added
Density of fuel
Density of water

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	61	66		0.7	0	0.1
2	10	2694	71	5	0.7	39	0.1
3	30	2726	446	380	0.7	375	0.1
4	50	2618	1121	1055	0.7	250	0.1
5	70	2778	1443	1377	0.7	110	0.1
6	90	3027	2097	2031	0.7	100	0.1
7	110	2845	1844	1778	3.4	60	0.5
8	130	3186	1925	1859	3.4	60	0.5
9	150	2700	1826	1760	3.4	80	0.5

Average Water Content (ppm):	1347
Time Weighted Average Water Removal Efficiency:	51.6
Water from Test Housing (mL):	1074
Water from Cleanup Filters (mL):	7100

Actual Test Time (min)	150
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Average Upstream	2821.75
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UNCLASSIFIED

UNCLASSIFIED

Filter: FL13-1316, Racor 400R-GDLS-01 (S3226P), Government specification filter

Fuel: FL12-1141, 50/50 Blend of Camelina HEFA and JP-8

Vehicle: Stryker

Table A-39. Additional Stryker (Government) SAE J1488 Results in Camelina HEFA and JP-8

Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet

Client:	U.S. Army	Test Number:	7
Project Number:	100948	Filter ID:	FL13-1316
Test Engineer:	P. Canant	Test Date:	2/11/2013
Test Fluid:	FL12-1141	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	33.584	
EOT	38.275	

DSEP	Before Additive	After Additive
BOT	98	
EOT	100	

Baseline 79

Amount of ULSD added
Amount of Mono added
Density of fuel
Density of water

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	57	79		0.7	0	0.1
2	10	2840	118	39	0.7	20	0.1
3	30	2976	178	99	0.7	350	0.1
4	50	2849	339	260	0.7	355	0.1
5	70	2795	562	483	0.7	345	0.1
6	90	2628	607	528	0.7	315	0.1
7	110	2614	601	522	0.7	312	0.1
8	130	2506	1034	955	0.7	240	0.1
9	150	2856	933	854	0.7	246	0.1

Average Water Content (ppm):	547
Time Weighted Average Water Removal Efficiency:	82.0
Water from Test Housing (mL):	2183
Water from Cleanup Filters (mL):	6250

Actual Test Time (min)	150
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Average Upstream	2758.00
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UNCLASSIFIED

Filter: FL13-1307, Racor 490P30, Commercial equivalent filter

Fuel: FL12-1140, 50/50 Blend of SPK and JP-8

Vehicle: Stryker

Table A-40. Additional Stryker (Commercial) SAE J1488 Results in SPK and JP-8

**Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet**

Client:	U.S. Army	Test Number:	10
Project Number:	100948	Filter ID:	FL13-1307
Test Engineer:	P. Canant	Test Date:	2/14/2013
Test Fluid:	FL12-1140	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	45.254	
EOT	45.356	

	Before Additive	After Additive
DSEP		
BOT	98	
EOT	100	
Baseline	115	

Amount of ULSD added
Amount of Mono added
Density of fuel
Density of water

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	68	115		3.4	0	0.5
2	10	2464	108	0	3.4	94	0.5
3	30	2774	120	5	3.4	395	0.5
4	50	2477	137	22	3.4	425	0.5
5	70	2459	196	81	3.4	425	0.5
6	90	2601	410	295	3.4	390	0.5
7	110	2487	512	397	3.4	350	0.5
8	130	2660	784	669	3.4	300	0.5
9	150	2355	926	811	3.4	275	0.5

Average Water Content (ppm):	399
Time Weighted Average Water Removal Efficiency:	88.0
Water from Test Housing (mL):	2654
Water from Cleanup Filters (mL):	6000

Actual Test Time (min)	150
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Average Upstream	2534.63
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Filter: FL13-1317, Racor 400R-GDLS-01 (S3226P), Government specification filter

Fuel: FL12-1140, 50/50 Blend of SPK and JP-8

Vehicle: Stryker

Table A-41. Additional Stryker (Government) SAE J1488 Results in SPK and JP-8

Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet

Client:	U.S. Army	Test Number:	9
Project Number:	100948	Filter ID:	FL13-1317
Test Engineer:	P. Canant	Test Date:	2/13/2013
Test Fluid:	FL12-1140	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	45.475	
EOT	45.569	

DSEP	Before Additive	After Additive
BOT	99	
EOT	100	
Baseline	105	

Amount of ULSD added
Amount of Mono added
Density of fuel
Density of water

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	72	105		0.7	0	0.1
2	10	2340	229	124	0.7	50	0.1
3	30	2626	284	179	3.4	355	0.5
4	50	2239	521	416	3.4	350	0.5
5	70	2708	1161	1056	3.4	300	0.5
6	90	2639	1025	920	3.4	250	0.5
7	110	2430	924	819	3.4	200	0.5
8	130	2615	1290	1185	3.4	150	0.5
9	150	2125	1201	1096	3.4	150	0.5

Average Water Content (ppm):	829
Time Weighted Average Water Removal Efficiency:	69.0
Water from Test Housing (mL):	1805
Water from Cleanup Filters (mL):	5800

Actual Test Time (min)	150
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Average Upstream	2465.25
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UNCLASSIFIED

Filter: FL13-1310, Racor 490P30, Commercial Equivalent Filter

Fuel: Ultra Low Sulfur Diesel with Mono-olein

Vehicle: Stryker

Table A-42. Additional Stryker (Commercial) SAE J1488 Results in ULSD with Mono-olein

**Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet**

Client:	U.S. Army	Test Number:	11
Project Number:	100948	Filter ID:	FL13-1310
Test Engineer:	P. Canant	Test Date:	3/7/2013
Test Fluid:	ULSD&MONO	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	26
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	31.037	14.459
EOT		14.972

	Before Additive	After Additive
DSEP		
BOT	97	0
EOT		0

Baseline 90

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	90	107		1.4	0	0.2
2	10	2505	2717	2627	4.8	0	0.7
3	30	2502	2752	2662	3.4	0	0.5
4	50	2597	2786	2696	4.8	0	0.7
5	70	2502	2939	2849	4.8	0	0.7
6	90	2550	2890	2800	4.8	0.1	0.7
7	110	2573	3577	3487	4.8	0	0.7
8	130	2583	3273	3183	4.8	0	0.7
9	150	2570	3213	3123	4.8	0	0.7

Amount of ULSD added
Amount of Mono added
150ml
Density of fuel
0.799
Density of water
0.998

Average Water Content (ppm):	3018
Time Weighted Average Water Removal Efficiency:	0.0
Water from Test Housing (mL):	0.1
Water from Cleanup Filters (mL):	5,400

Actual Test Time (min)	150
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Average Upstream	2547.75
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UNCLASSIFIED

Filter: FL13-1318, Racor 400R-GDLS-01 (S3226P), Government Specification Filter

Fuel: Ultra Low Sulfur Diesel with Mono-olein

Vehicle: Stryker

Table A-43. Additional Stryker (Government) SAE J1488 Results in ULSD with Mono-olein

Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet

Client:	U.S. Army	Test Number:	12
Project Number:	100948	Filter ID:	FL13-1318
Test Engineer:	P. Canant	Test Date:	2/27/2013
Test Fluid:	ULSD + Mono	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	28.6	13.5
EOT		13.8

DSEP	Before Additive	After Additive
BOT	94	0
EOT	0	

Baseline 79

Amount of ULSD added
Amount of Mono added
175ml
Density of fuel
0.796
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	79	74		1.4	0	0.2
2	10	2334	2176	2097	4.1	0	0.6
3	30	2370	2385	2306	5.5	0	0.8
4	50	2634	2595	2516	5.5	1	0.8
5	70	2621	2778	2699	5.5	1	0.8
6	90	2696	2237	2158	5.5	0.5	0.8
7	110			0			
8	130			0			
9	150			0			

Average Water Content (ppm):	2434
Time Weighted Average Water Removal Efficiency:	5.8
Water from Test Housing (mL):	2.5
Water from Cleanup Filters (mL):	3500

Actual Test Time (min)	90
------------------------	----

Average Upstream	2531.00
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Filter: FL13-1520, Racor 400R-GDLS-01 (S3226P), Government Specification Filter

Fuel: Jet A

Vehicle: Stryker

Table A-44. Baseline Stryker(Government) SAE J1488 Results in Jet A

Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet

Client:	U.S. Army	Test Number:	Jet-A Dummy Run
Project Number:	15496.01.401	Filter ID:	FL13-1520
Test Engineer:	P. Canant	Test Date:	11/18/2013
Test Fluid:	Jet-A	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25°C
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	Pressure

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	37.3	
EOT	39.6	

DSEP	Before Additive	After Additive
BOT	98	
EOT	96	

Amount of ULSD added (L)

90
Amount of Mono-oleate added (mL)
-
Density of fuel
0.782
Density of water
0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	95	125	0	6.9	0	1.0
2	10	1176	111	111	11.7	75	1.7
3	30	1914	204	204	6.9	375	1.0
4	50	2525	171	171	4.8	700	0.7
5	70	2063	180	180	5.5	350	0.8
6	90	2708	281	281	6.9	215	1.0
7	110	2689	225	225	5.5	350	0.8
8	130	2236	321	321	5.5	575	0.8
9	150	2395	259	259	6.2	300	0.9

Time Average Undissolved Effluent Water Level	226
Average Water Content (ppm):	219
Time Weighted Average Water Removal Efficiency:	89.8
Water from Test Housing (mL):	2940
Water from Cleanup Filters (mL):	0

Actual Test Time (min)	150
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Average Upstream (ppm)	2213
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Filter: FL13-1521, Racor 400R-GDLS-01 (S3226P), Government Specification Filter

Fuel: JP-8

Vehicle: Stryker

Table A-45. Baseline Stryker(Government) SAE J1488 Results in JP-8

Fuel/Water Separation Test Stand
SAE J1488/SAE J1839 Data Sheet

Client:	U.S. Army	Test Number:	2 JP8
Project Number:	15496.01.401	Filter ID:	FL13-1521
Test Engineer:	P. Canant	Test Date:	11/19/2013
Test Fluid:	JP-8	Test Fluid Flow Rate (LPM):	5.7
Water Injection Rate (mL/min):		Test Temperature (°C):	25°C
Water Saturation Limit (ppm):	2500	Vacuum/Pressure:	

Fuel/Water Interfacial Tension (mN/m)

	Before Additive	After Additive
BOT	40.2	36.7
EOT	-	38.2

	Before Additive	After Additive
DSEP		
BOT	95	68
EOT	-	79

Amount of ULSD added (L)	90
Amount of Mono-oleate added	-
Density of fuel	0.785
Density of water	0.998

Sample Identification	Time (minutes)	Upstream Water Content	Downstream Water Content (ppm)	Free Water Content (ppm)	Pressure Drop (kPa)	Water Drained (mL)	Differential Pressure (psi)
1	0	133	124	0	5.5	0	0.8
2	10	2888	401	401	4.8	75	0.7
3	30	2570	477	477	4.1	200	0.6
4	50	2697	588	588	6.9	225	1.0
5	70	3705	675	675	6.9	215	1.0
6	90	2402	523	523	6.2	225	0.9
7	110	2658	747	747	6.2	210	0.9
8	130	2797	798	798	6.9	205	1.0
9	150	2690	804	804	4.8	225	0.7

Time Average Undissolved Effluent Water Level	642
Average Water Content (ppm):	627
Time Weighted Average Water Removal Efficiency:	77.1
Water from Test Housing (mL):	1580
Water from Cleanup Filters (mL):	200

Actual Test Time (min)	150
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Average Upstream (ppm)	2801
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UNCLASSIFIED

APPENDIX B. ISO 19438 TEST RESULTS

Filter: FL12-1112, Kaydon A910162

Vehicle: HMMWV

UNCLASSIFIED

TARDEC

FILTER ELEMENT MULTI-PASS TEST REPORT SHEET

ISO/DIS 19438

TEST No. :	MUL00476
TEST DATE :	8/3/12
OPERATOR :	RVL

TEST CONTAMINANT	
TYPE :	A-3
BATCH No. :	5544Q

FILTER AND ELEMENT IDENTIFICATION	
P/N :	A910162
ELEMENT ID :	FL12-1112
HOUSING ID :	HMMWV
ELEMENT TYPE :	CARTRIDGE
MIN. ELEMENT BUBBLE POINT (in. H2O) :	0.00
BUBBLE POINT TO ISO 2942 (in. H2O) :	0.00
WETTING FLUID :	ALCOHOL

TEST SYSTEM	
FLOW RATE (gpm) :	1.00
INITIAL VOLUME (L) :	14.00
FINAL VOLUME (L) :	14.00

UPSTREAM CONCENTRATION (mg/L)			
BASE :	89.05	80% :	64.00

DIFFERENTIAL PRESSURE DATA	
TERMINAL ELEMENT (psid) :	10.00
FILTER HOUSING (psid) :	42.51
CLEAN ASSEMBLY (psid) :	39.33
CLEAN ELEMENT (psid) :	-3.18
NET (psid) :	13.18

TEST FLUID	
TYPE :	Shell
REF :	5606
BATCH No. :	4055728
VISCOSITY (cSt) :	15.00
TEMPERATURE (oF) :	100.00
ANTI-STATIC TYPE ADDED :	Stadis 450
CONDUCTIVITY (pS/m) :	1500.00

INJECTION SYSTEM			
	INITIAL	FINAL	AVERAGE
FLOW (L/min)	0.307	0.302	0.304
CONCEN. (mg/L)	1114.000	1100.000	1107.000

RETENTION CAPACITY (gram)			
TEST DUST			
INJECTED :	8.37	RETAINED :	7.67

COUNTING SYSTEM	COUNTER AND SENSOR REF.	FLOW RATE (ml/min)	DILUTION RATIO
UPSTREAM	Met One	50	None
DOWNSTREAM	Met One	50	None

COUNTER CALIBRATION METHOD	COUNTER CALIBRATION DATE
ISO 11171	6/30/12

DIFFERENTIAL PRESSURE VERSUS CONTAMINANT ADDED

% NET PRESSURE	TEST TIME (min)	ELEMENT DP (psid)	INJECTED MASS (gram)
5%	3.26	-2.52	1.10
10%	4.08	-1.86	1.38
15%	4.15	-1.20	1.40
20%	4.22	-0.54	1.42
40%	4.36	2.09	1.47
80%	23.51	7.36	7.92
100%	24.84	10.00	8.37

EFFICIENCY DATA

	4.0 um(c)	6.0 um(c)	8.0 um(c)	10.0 um(c)	12.0 um(c)	15.0 um(c)	25.0 um(c)	30.0 um(c)
MAX. EFF.(%)	26.72	94.06	99.83	99.99	100.00	100.00	100.00	100.00
MIN.EFF. (%)	2.32	64.33	95.98	99.63	99.95	100.00	100.00	100.00
AVG. EFF. (%)	7.53	78.58	98.33	99.87	99.98	100.00	100.00	100.00

EFFICIENCY (%)	50.0	75.0	90.0	95.0	99.0
PARTICLE SIZE um(c)	4.8	5.8	6.6	7.1	8.4

REMARKS

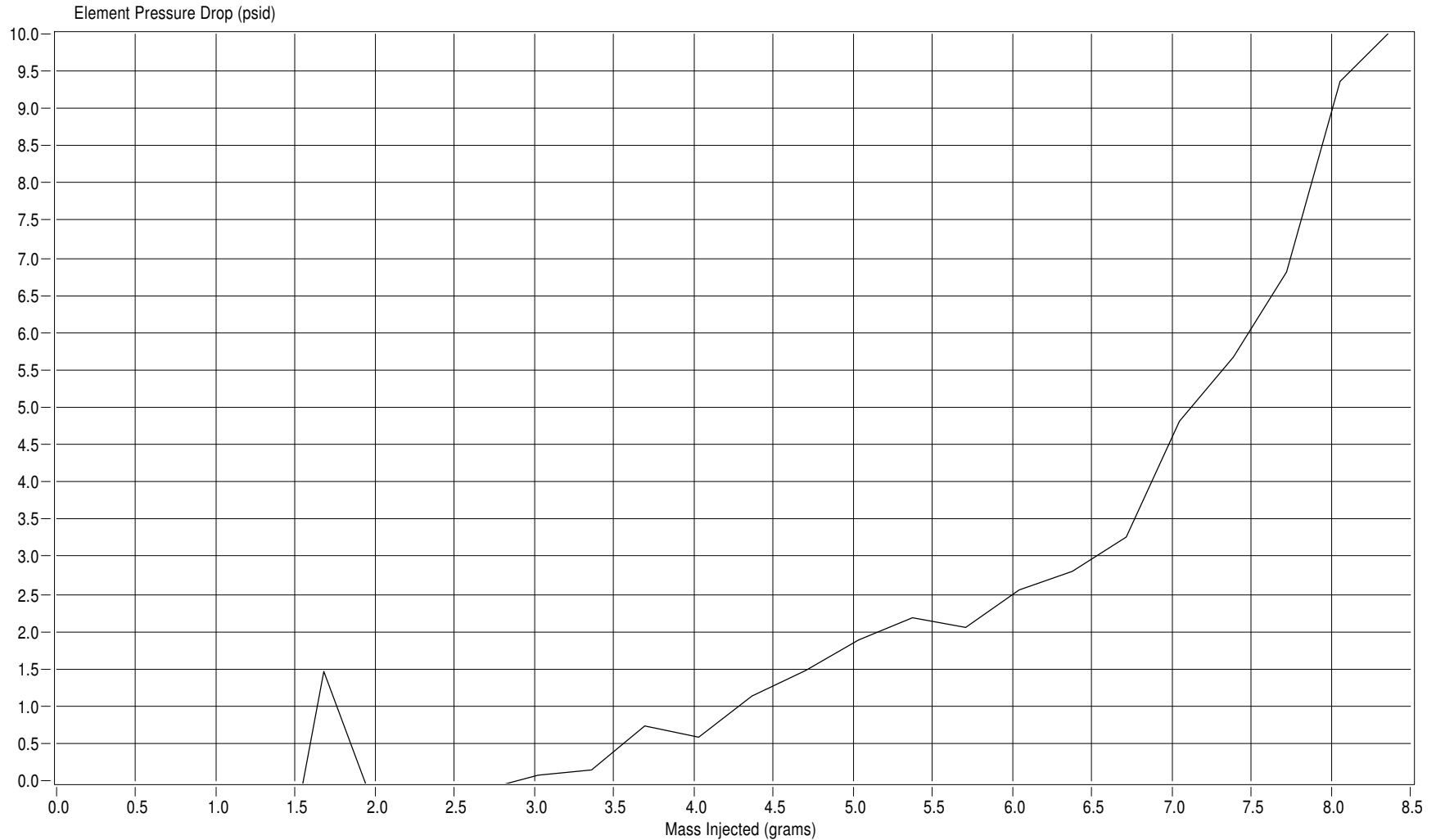
P/N :	A910162	TEST No. :	MUL00476
ID :	FL12-1112	TEST DATE :	8/3/12

[illegible]

Differential Pressure Versus Contaminant Added

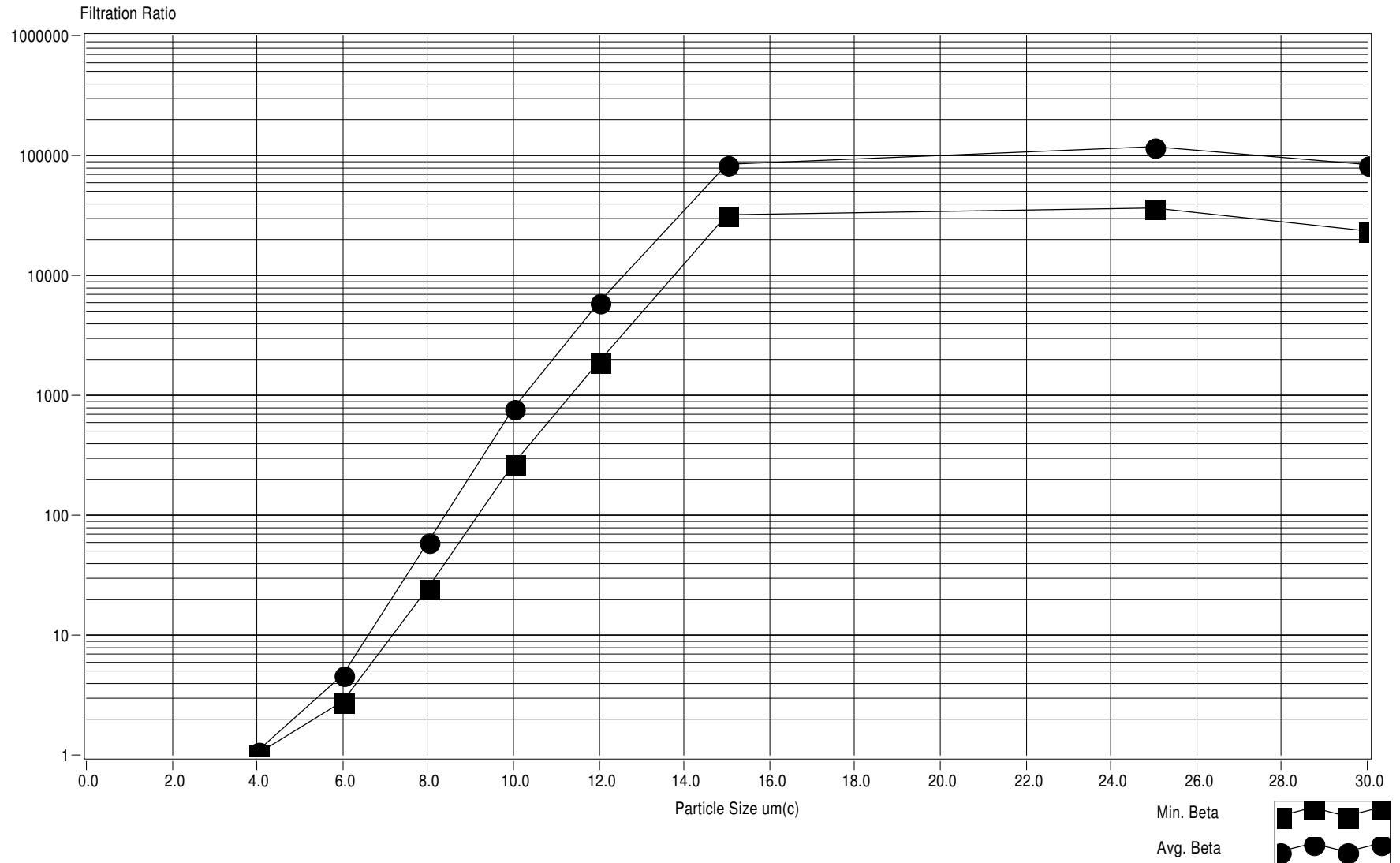
P/N.: A910162
ID: FL12-1112
TERMINAL (psid): 10.00

TEST No.: MUL00476
TEST DATE: 8/3/12
OPERATOR: RVL



Filtration Ratio Versus Particle Size

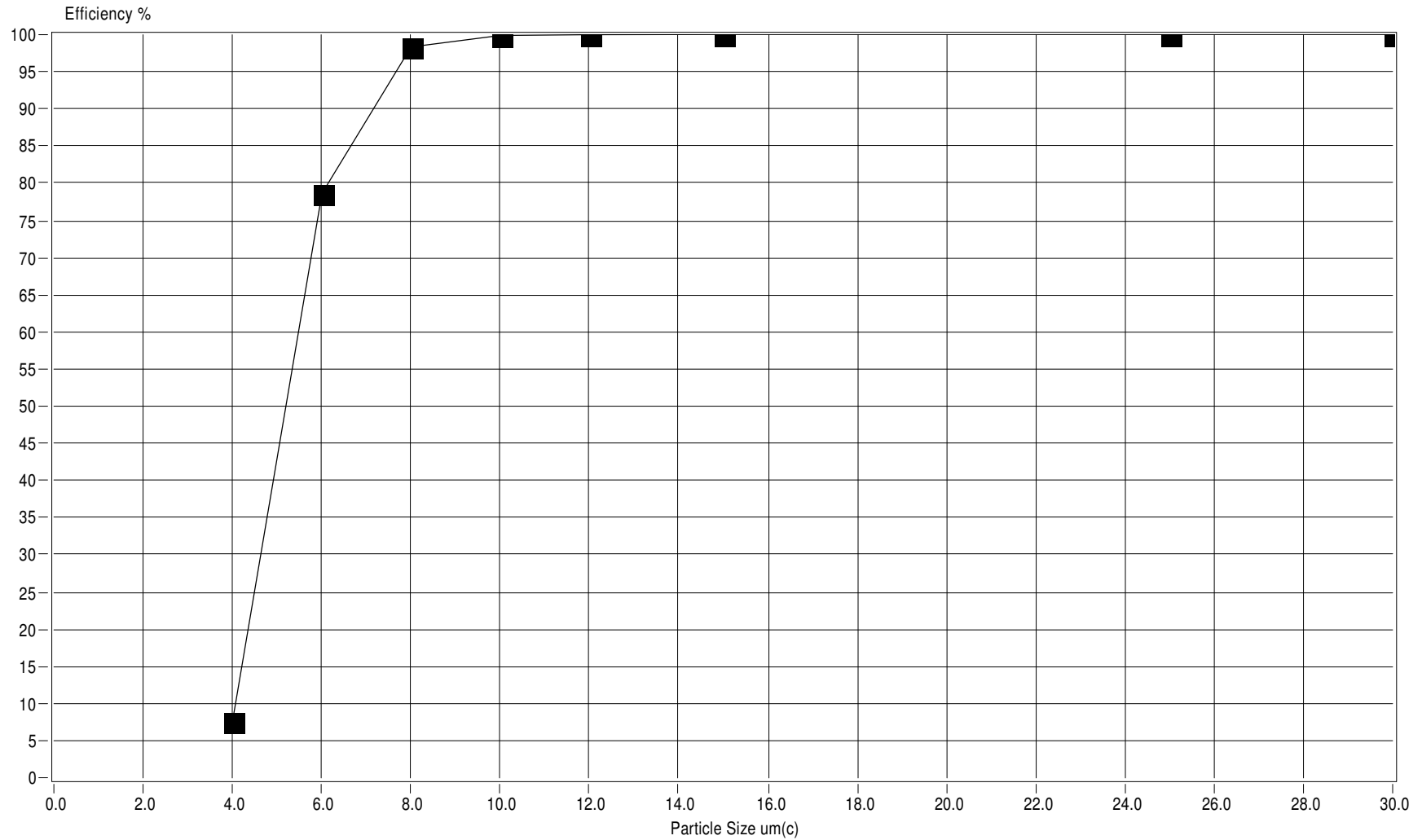
P/N.:	A910162	TEST No.:	MUL00476
ID:	FL12-1112	TEST DATE:	8/3/12
TERMINAL (psid):	10.00	OPERATOR:	RVL



Efficiency Versus Particle Size

P/N.: A910162
ID: FL12-1112
TERMINAL (psid): 10.00

TEST No.: MUL00476
TEST DATE: 8/3/12
OPERATOR: RVL



TARDEC MULTI-PASS TEST DATA SHEET

P/N:	A910162
ID:	FL12-1112
Test No.:	MUL00476

<table style="width: 100%;"> <tr><td>P/N:</td><td>A910162</td></tr> <tr><td>Element ID:</td><td>FL12-1112</td></tr> <tr><td>Test No.:</td><td>MUL00476</td></tr> <tr><td>Test Date:</td><td>8/3/12</td></tr> <tr><td>Operator:</td><td>RVL</td></tr> <tr><td>Manufacture:</td><td>KYDON</td></tr> <tr><td>Element Type:</td><td>CARTRIDGE</td></tr> <tr><td>General Inf.:</td><td>HMMWV-WATER SEP.</td></tr> <tr><td>Project No.:</td><td>100884</td></tr> <tr><td>Company:</td><td>ARMY-WD17</td></tr> <tr><td>Test Housing ID:</td><td>HMMWV</td></tr> </table>	P/N:	A910162	Element ID:	FL12-1112	Test No.:	MUL00476	Test Date:	8/3/12	Operator:	RVL	Manufacture:	KYDON	Element Type:	CARTRIDGE	General Inf.:	HMMWV-WATER SEP.	Project No.:	100884	Company:	ARMY-WD17	Test Housing ID:	HMMWV	<table style="width: 100%;"> <tr><td>Element Area (Sq.Inch)</td><td>1.000E+0</td></tr> <tr><td>Capacity (g/Sq.Inch)</td><td>8.37</td></tr> <tr><td>Flux (gpm/Sq.Inch)</td><td>1.00</td></tr> <tr><td>No. of Pleats:</td><td>0.00</td></tr> <tr><td>Pleat Height (Inch)</td><td>0.00</td></tr> <tr><td>Pleat Length (Inch)</td><td>0.00</td></tr> <tr><td>Filter O.D. (Inch)</td><td>0.00</td></tr> </table>	Element Area (Sq.Inch)	1.000E+0	Capacity (g/Sq.Inch)	8.37	Flux (gpm/Sq.Inch)	1.00	No. of Pleats:	0.00	Pleat Height (Inch)	0.00	Pleat Length (Inch)	0.00	Filter O.D. (Inch)	0.00
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TARDEC MULTI-PASS TEST DATA SHEET

P/N:	A910162
ID:	FL12-1112
Test No.:	MUL00476

Terminal Pressure [psid]:	10.00
Housing Pressure [psid]:	42.51
Clean Assembly [psid]:	39.33
Clean Filter Media [psid]:	-3.18
Net [psid]:	13.18

Dust Injected [g]:	8.37
Dust Retained [g]:	7.67

Base U.G.L [mg/l]:	89.05
Final U.G.L [mg/L]:	64.00

Initial Inj Grav. [mg/l]:	1114.00
Final Inj Grav. [mg/L]:	1100.00

Initial Inj Flow [lpm]:	0.31
Final Inj Flow [lpm]:	0.30

% Assembly	Time at	Time of Count
D.P.	% of Assembly	at % of
	D.P. [min]	Assembly
		D.P. [min]
2.5%	2.70	1.99
5%	3.26	3.00
10%	4.08	3.99
15%	4.15	3.99
20%	4.22	3.99
30%	4.29	3.99
40%	4.36	3.99
80%	23.51	22.95
100%	24.84	23.95

Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
BCK	39.33	1.00	UP	529.81	58.86	24.18	11.25	6.16	3.40	0.69	0.33	48.71	100.40
0		1.00	DOWN	2435.47	3.05	0.18	0.02	0.00	0.00	0.00	0.00	50.05	
			BETA	0.22	19.30	134.33	562.50	99999.99	99999.99	99999.99	99999.99		
0.01	39.73	1.00	UP	7612.44	2999.73	1218.00	593.22	326.10	155.23	23.18	11.68	50.25	99.90
1		1.00	DOWN	3787.09	10.31	0.34	0.06	0.02	0.00	0.00	0.00	50.44	
			BETA	2.01	290.95	3582.35	9887.00	16305.00	99999.99	99999.99	99999.99		
1.00	39.29	1.00	UP	28031.42	16446.70	8067.93	4356.52	2556.87	1251.25	175.50	81.67	49.84	99.39
2		1.00	DOWN	11545.73	349.11	4.32	0.12	0.04	0.02	0.00	0.00	49.43	
			BETA	2.43	47.11	1867.58	36304.33	63921.75	62562.50	99999.99	99999.99		
1.99	39.41	1.00	UP	30318.45	18756.08	9596.87	5323.97	3176.88	1563.34	211.19	99.16	49.67	98.63
3		1.00	DOWN	17488.00	681.70	7.86	0.14	0.00	0.00	0.00	0.00	50.82	
			BETA	1.73	27.51	1220.98	38028.36	99999.99	99999.99	99999.99	99999.99		
3.00	39.77	1.00	UP	31447.52	21613.38	11992.36	6966.52	4289.62	2164.10	305.94	144.10	49.74	98.00
4		1.00	DOWN	20248.04	919.30	12.08	0.16	0.00	0.00	0.00	0.00	58.94	
			BETA	1.55	23.51	992.75	43540.75	99999.99	99999.99	99999.99	99999.99		
3.99	40.17	1.00	UP	32095.42	24162.83	14591.07	8959.33	5717.28	2933.87	424.34	198.97	49.50	98.00
5		1.00	DOWN	26316.56	1801.09	33.17	0.82	0.23	0.08	0.02	0.00	50.41	
			BETA	1.22	13.42	439.89	10926.01	24857.74	36673.37	21217.00	99999.99		
4.98	43.97	1.00	UP	32488.77	25369.43	15950.12	10058.70	6548.47	3423.53	495.31	234.22	51.46	97.57
6		1.00	DOWN	27427.96	1901.13	30.97	0.68	0.14	0.06	0.06	0.04	49.81	
			BETA	1.18	13.34	515.02	14792.21	46774.79	57058.83	8255.17	5855.50		
5.99	42.03	1.00	UP	32902.64	26333.64	17020.36	10936.88	7228.23	3818.36	561.64	268.33	49.98	97.19
7		1.00	DOWN	28780.85	2310.99	40.65	1.13	0.04	0.00	0.00	0.00	48.71	
			BETA	1.14	11.39	418.71	9678.65	180705.75	99999.99	99999.99	99999.99		
6.99	41.99	1.00	UP	33316.80	27058.77	17796.55	11585.80	7744.52	4143.19	618.97	291.14	50.25	96.84
8		1.00	DOWN	29637.97	2787.48	53.48	1.17	0.08	0.00	0.00	0.00	49.81	
			BETA	1.12	9.71	332.77	9902.39	96806.50	99999.99	99999.99	99999.99		
7.99	42.39	1.00	UP	33121.73	27168.88	18064.99	11851.33	7958.13	4280.69	639.11	304.55	50.19	96.62
9		1.00	DOWN	30351.46	3290.72	70.31	1.86	0.12	0.02	0.02	0.02	49.73	
			BETA	1.09	8.26	256.93	6371.68	66317.75	214034.50	31955.50	15227.50		
8.98	42.58	1.00	UP	33633.04	27640.90	18413.95	12109.62	8148.55	4395.49	654.37	308.03	50.62	96.32
10		1.00	DOWN	30925.92	3746.20	90.42	2.33	0.18	0.04	0.00	0.00	50.62	
			BETA	1.09	7.38	203.65	5197.26	45269.72	109887.25	99999.99	99999.99		
9.98	42.65	1.00	UP	33445.11	27642.60	18530.32	12220.09	8248.08	4472.87	672.64	314.59	50.77	96.12
11		1.00	DOWN	31289.58	4208.59	106.97	2.45	0.08	0.00	0.00	0.00	50.57	
			BETA	1.07	6.57	173.23	4987.79	103101.00	99999.99	99999.99	99999.99		
10.97	43.24	1.00	UP	33739.33	27868.22	18681.64	12342.30	8361.58	4528.29	689.40	325.36	50.12	95.93
12		1.00	DOWN	31514.01	4615.58	128.09	3.44	0.22	0.02	0.00	0.00	49.26	
			BETA	1.07	6.04	145.85	3587.88	38007.18	226414.50	99999.99	99999.99		
11.98	43.09	1.00	UP	33829.88	27984.50	18762.15	12402.97	8394.69	4551.35	692.24	328.00	50.12	95.75
13		1.00	DOWN	31588.56	5000.64	150.62	4.18	0.26	0.02	0.00	0.00	49.80	
			BETA	1.07	5.60	124.57	2967.22	32287.27	227567.50	99999.99	99999.99		
12.97	43.64	1.00	UP	33431.09	27716.32	18625.43	12327.60	8358.84	4559.90	693.31	323.13	48.27	95.55
14		1.00	DOWN	31920.13	5516.50	183.39	5.24	0.42	0.00	0.00	0.00	50.27	
			BETA	1.05	5.02	101.56	2352.60	19902.00	99999.99	99999.99	99999.99		

P/N:	A910162	Test No.:	MUL00476	Page #	3
ID:	FL12-1112	Test Date:	8/3/12		

Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
13.97	43.98	1.00	UP	33966.15	28100.09	18840.77	12471.04	8443.43	4599.13	692.04	322.20	50.07	95.78
15		1.00	DOWN	32140.13	5945.38	208.18	6.10	0.30	0.02	0.00	0.00	50.78	
			BETA	1.06	4.73	90.50	2044.43	28144.77	229956.50	99999.99	99999.99		
14.96	44.39	1.00	UP	33564.98	27785.28	18597.18	12263.28	8313.16	4511.45	679.94	323.11	50.02	96.02
16		1.00	DOWN	32304.07	6269.00	238.71	8.08	0.49	0.00	0.00	0.00	50.29	
			BETA	1.04	4.43	77.91	1517.73	16965.63	99999.99	99999.99	99999.99		
15.97	44.69	1.00	UP	34065.28	28210.68	18938.59	12538.96	8519.62	4641.19	696.22	328.24	49.31	96.25
17		1.00	DOWN	32476.93	6732.37	277.97	10.56	0.57	0.04	0.00	0.00	49.63	
			BETA	1.05	4.19	68.13	1187.40	14946.70	116029.75	99999.99	99999.99		
16.96	44.56	1.00	UP	33556.87	27856.65	18720.25	12380.84	8402.50	4575.10	682.78	323.38	50.19	96.45
18		1.00	DOWN	32457.04	7118.58	315.44	12.58	0.98	0.00	0.00	0.00	49.92	
			BETA	1.03	3.91	59.35	984.17	8573.98	99999.99	99999.99	99999.99		
17.96	45.06	1.00	UP	34059.90	28291.07	18992.74	12588.77	8552.38	4653.58	701.39	333.27	50.19	96.63
19		1.00	DOWN	32853.11	7793.10	386.20	16.36	1.34	0.06	0.02	0.02	51.02	
			BETA	1.04	3.63	49.18	769.48	6382.37	77559.67	35069.50	16663.50		
18.95	45.31	1.00	UP	33951.06	28238.90	18992.29	12613.88	8577.22	4655.77	695.47	330.83	49.37	96.79
20		1.00	DOWN	32895.45	8158.25	438.48	19.20	1.15	0.02	0.00	0.00	48.94	
			BETA	1.03	3.46	43.31	656.97	7458.45	232788.50	99999.99	99999.99		
19.96	45.77	1.00	UP	33717.93	28110.48	18931.77	12583.88	8577.06	4662.97	712.77	340.29	51.33	97.00
21		1.00	DOWN	32948.92	8979.42	552.81	27.34	2.29	0.04	0.00	0.00	49.69	
			BETA	1.02	3.13	34.25	460.27	3745.44	116574.25	99999.99	99999.99		
20.95	47.32	1.00	UP	34039.89	28401.95	19178.52	12759.52	8690.94	4735.37	715.98	335.38	48.29	97.18
22		1.00	DOWN	33244.59	9741.54	668.25	36.44	2.92	0.08	0.00	0.00	50.08	
			BETA	1.02	2.92	28.70	350.15	2976.35	59192.12	99999.99	99999.99		
21.96	48.18	1.00	UP	34009.10	28404.01	19156.36	12749.59	8703.58	4753.11	720.61	344.36	51.91	97.35
23		1.00	DOWN	33149.25	10097.34	751.81	43.90	3.99	0.26	0.00	0.00	49.95	
			BETA	1.03	2.81	25.48	290.42	2181.35	18281.19	99999.99	99999.99		
22.95	49.32	1.00	UP	33922.37	28385.11	19125.01	12730.26	8683.24	4732.50	717.13	340.13	49.43	97.54
24		1.00	DOWN	33267.53	10454.69	840.91	53.55	5.41	0.08	0.00	0.00	51.51	
			BETA	1.02	2.72	22.74	237.73	1605.04	59156.25	99999.99	99999.99		
23.95	51.87	1.00	UP	34180.42	28611.91	19321.64	12879.92	8808.87	4825.56	735.69	350.64	48.93	97.79
25		1.00	DOWN	33319.97	11345.49	1036.71	75.59	8.07	0.28	0.00	0.00	50.58	
			BETA	1.03	2.52	18.64	170.39	1091.56	17234.14	99999.99	99999.99		
									</				

P/N: A910162

ID: FL12-1112

Test No.: MUL00476

Test Date: 8/3/12

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UNCLASSIFIED

APPENDIX C. ISO 19438 TEST RESULTS

Filter: FL12-1105, CAT 1R-0749

Vehicle: Stryker

UNCLASSIFIED

TARDEC

FILTER ELEMENT MULTI-PASS TEST REPORT SHEET

ISO/DIS 19438

TEST No. :	MUL00469
TEST DATE :	7/12/12
OPERATOR :	RVL

TEST CONTAMINANT

TYPE :	A-3
BATCH No. :	5544Q

FILTER AND ELEMENT IDENTIFICATION

P/N :	1R-0749
ELEMENT ID :	FL12-1105
HOUSING ID :	
ELEMENT TYPE :	Spin on
MIN. ELEMENT BUBBLE POINT (in. H2O) :	0.00
BUBBLE POINT TO ISO 2942 (in. H2O) :	0.00
WETTING FLUID :	ALCOHOL

TEST SYSTEM

FLOW RATE (gpm) :	1.50
INITIAL VOLUME (L) :	14.00
FINAL VOLUME (L) :	14.00

UPSTREAM CONCENTRATION (mg/L)

BASE :	39.73	80% :	52.00
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DIFFERENTIAL PRESSURE DATA

TERMINAL ELEMENT (psid) :	10.00
FILTER HOUSING (psid) :	1.98
CLEAN ASSEMBLY (psid) :	1.92
CLEAN ELEMENT (psid) :	-0.06
NET (psid) :	10.06

TEST FLUID

TYPE :	Shell
REF :	5606
BATCH No. :	4055728
VISCOSITY (cSt) :	15.00
TEMPERATURE (oF) :	100.00
ANTI-STATIC TYPE ADDED :	Stadis 450
CONDUCTIVITY (pS/m) :	1500.00

INJECTION SYSTEM

	INITIAL	FINAL	AVERAGE
FLOW (L/min)	0.221	0.170	0.196
CONCEN. (mg/L)	1052.000	1256.000	1154.000

RETENTION CAPACITY (gram)

TEST DUST

INJECTED :	111.79	RETAINED :	109.88
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COUNTING SYSTEM	COUNTER AND SENSOR REF.	FLOW RATE (ml/min)	DILUTION RATIO
UPSTREAM	Met One	50	None
DOWNSTREAM	Met One	50	None

COUNTER CALIBRATION METHOD	COUNTER CALIBRATION DATE
ISO 11171	6/30/12

DIFFERENTIAL PRESSURE VERSUS CONTAMINANT ADDED

% NET PRESSURE	TEST TIME (min)	ELEMENT DP (psid)	INJECTED MASS (gram)
5%	49.38	0.44	11.14
10%	67.22	0.94	15.17
15%	78.18	1.45	17.64
20%	91.31	1.95	20.60
40%	175.88	3.96	39.68
80%	377.60	7.99	85.19
100%	495.52	10.00	111.79

EFFICIENCY DATA

	4.0 um(c)	6.0 um(c)	8.0 um(c)	10.0 um(c)	12.0 um(c)	15.0 um(c)	25.0 um(c)	30.0 um(c)
MAX. EFF. (%)	97.27	99.76	99.93	99.97	99.99	100.00	100.00	100.00
MIN. EFF. (%)	7.65	86.08	98.92	99.85	99.95	99.95	99.96	99.96
AVG. EFF. (%)	85.02	98.41	99.83	99.95	99.97	99.97	99.98	99.98

EFFICIENCY (%)	50.0	75.0	90.0	95.0	99.0
PARTICLE SIZE um(c)	----	----	4.4	5.0	6.4

REMARKS

**TARDEC
FILTER ELEMENT MULTI-PASS TEST REPORT SHEET
ISO/DIS 19438**

P/N :	1R-0749	TEST No. :	MUL00469
ID :	FL12-1105	TEST DATE :	7/12/12

PARTICLE DISTRIBUTION ANALYSIS (PARTICLES/MILLILITER)

Sample Point		4.0 um(c)	6.0 um(c)	8.0 um(c)	10.0 um(c)	12.0 um(c)	15.0 um(c)	25.0 um(c)	30.0 um(c)
Initial		697.58	10.58	1.22	0.65	0.40	0.20	0.02	0.00
9.98 min	UP	32061.29	24213.10	14717.01	9079.54	5823.95	3007.40	428.84	200.39
0.07 (psid)	DOWN	26626.14	2985.55	153.97	13.06	2.11	0.14	0.01	0.01
	EFF.(%)	16.95	87.67	98.95	99.86	99.96	100.00	100.00	100.00
19.96 min	UP	32613.89	25323.83	15770.96	9896.60	6433.27	3359.44	485.93	227.85
0.20 (psid)	DOWN	29798.70	3524.51	169.56	14.67	2.41	0.16	0.01	0.01
	EFF.(%)	8.63	86.08	98.92	99.85	99.96	100.00	100.00	100.00
29.94 min	UP	32590.29	25277.88	15736.26	9874.87	6419.80	3352.95	486.86	227.24
0.19 (psid)	DOWN	30097.98	3353.73	152.27	13.00	2.00	0.16	0.00	0.00
	EFF.(%)	7.65	86.73	99.03	99.87	99.97	100.00	100.00	100.00
39.92 min	UP	32651.15	25358.53	15808.84	9928.75	6454.13	3369.93	487.07	228.89
0.28 (psid)	DOWN	29510.90	2836.38	120.82	10.13	1.64	0.14	0.00	0.00
	EFF.(%)	9.62	88.81	99.24	99.90	99.97	100.00	100.00	100.00
49.90 min	UP	32524.83	25369.98	15936.89	10059.35	6565.35	3442.20	500.03	235.21
0.43 (psid)	DOWN	27713.58	2095.14	84.76	7.13	1.17	0.10	0.01	0.01
	EFF.(%)	14.79	91.74	99.47	99.93	99.98	100.00	100.00	100.00
59.89 min	UP	32059.69	24781.59	15466.92	9718.13	6318.16	3295.24	479.37	225.98
0.68 (psid)	DOWN	22958.00	1219.26	52.64	4.95	1.04	0.14	0.01	0.01
	EFF.(%)	28.39	95.08	99.66	99.95	99.98	100.00	100.00	100.00
69.87 min	UP	32007.97	24766.54	15490.02	9727.20	6316.78	3293.38	480.01	226.58
1.07 (psid)	DOWN	14656.81	671.36	37.19	4.14	1.08	0.31	0.03	0.01
	EFF.(%)	54.21	97.29	99.76	99.96	99.98	99.99	99.99	99.99
79.85 min	UP	31659.47	24243.52	15011.50	9369.58	6051.49	3138.44	454.78	215.08
1.51 (psid)	DOWN	7562.03	402.34	28.57	3.69	1.02	0.29	0.02	0.00
	EFF.(%)	76.11	98.34	99.81	99.96	99.98	99.99	99.99	100.00
89.84 min	UP	31386.20	24372.94	15353.92	9713.29	6329.68	3294.61	473.46	223.75
1.86 (psid)	DOWN	4983.32	291.76	22.82	3.21	0.96	0.31	0.03	0.02
	EFF.(%)	84.12	98.80	99.85	99.97	99.98	99.99	99.99	99.99

**TARDEC
FILTER ELEMENT MULTI-PASS TEST REPORT SHEET
ISO/DIS 19438**

P/N :	1R-0749	TEST No. :	MUL00469
ID :	FL12-1105	TEST DATE :	7/12/12

PARTICLE DISTRIBUTION ANALYSIS (PARTICLES/MILLILITER)

Sample Point		4.0 um(c)	6.0 um(c)	8.0 um(c)	10.0 um(c)	12.0 um(c)	15.0 um(c)	25.0 um(c)	30.0 um(c)
99.82 min	UP	31601.05	24928.34	15981.47	10222.19	6719.56	3526.39	511.17	240.50
2.16 (psid)	DOWN	3897.27	231.04	19.46	3.01	0.98	0.32	0.03	0.01
	EFF.(%)	87.67	99.07	99.88	99.97	99.99	99.99	99.99	100.00
109.80 min	UP	31676.52	24783.12	15716.52	9967.31	6511.50	3404.59	494.34	233.48
2.55 (psid)	DOWN	3029.10	189.83	16.90	2.88	1.07	0.36	0.02	0.00
	EFF.(%)	90.44	99.23	99.89	99.97	99.98	99.99	100.00	100.00
119.78 min	UP	31549.71	24632.08	15623.83	9914.97	6474.08	3380.12	493.89	234.53
2.79 (psid)	DOWN	2263.67	158.61	14.96	2.77	1.04	0.38	0.03	0.01
	EFF.(%)	92.83	99.36	99.90	99.97	99.98	99.99	99.99	100.00
129.76 min	UP	31568.53	24598.04	15542.34	9840.48	6418.58	3350.99	486.56	229.10
3.02 (psid)	DOWN	1889.75	137.51	13.69	2.84	1.13	0.44	0.03	0.01
	EFF.(%)	94.01	99.44	99.91	99.97	99.98	99.99	99.99	100.00
139.73 min	UP	31418.52	24527.25	15565.83	9895.30	6474.71	3387.04	496.67	235.93
3.22 (psid)	DOWN	1547.56	114.00	12.16	2.79	1.21	0.45	0.04	0.01
	EFF.(%)	95.07	99.54	99.92	99.97	99.98	99.99	99.99	99.99
149.71 min	UP	31610.62	25008.64	16095.85	10329.94	6813.07	3590.33	526.20	248.28
3.43 (psid)	DOWN	1415.87	103.16	11.88	3.02	1.36	0.58	0.05	0.02
	EFF.(%)	95.52	99.59	99.93	99.97	99.98	99.98	99.99	99.99
159.69 min	UP	31800.67	25221.24	16262.56	10434.62	6873.88	3619.98	529.14	250.38
3.61 (psid)	DOWN	1307.26	97.63	11.70	3.08	1.42	0.58	0.05	0.02
	EFF.(%)	95.89	99.61	99.93	99.97	99.98	99.98	99.99	99.99
169.68 min	UP	31895.44	25451.65	16520.57	10655.12	7051.60	3730.61	545.30	258.60
3.89 (psid)	DOWN	1298.05	95.66	11.90	3.20	1.51	0.66	0.06	0.02
	EFF.(%)	95.93	99.62	99.93	99.97	99.98	99.98	99.99	99.99
179.65 min	UP	32068.84	25738.62	16821.22	10896.88	7231.59	3839.19	567.59	267.73
4.07 (psid)	DOWN	1224.54	94.11	12.45	3.56	1.71	0.66	0.06	0.03
	EFF.(%)	96.18	99.63	99.93	99.97	99.98	99.98	99.99	99.99

**TARDEC
FILTER ELEMENT MULTI-PASS TEST REPORT SHEET
ISO/DIS 19438**

P/N :	1R-0749	TEST No. :	MUL00469
ID :	FL12-1105	TEST DATE :	7/12/12

PARTICLE DISTRIBUTION ANALYSIS (PARTICLES/MILLILITER)

Sample Point		4.0 um(c)	6.0 um(c)	8.0 um(c)	10.0 um(c)	12.0 um(c)	15.0 um(c)	25.0 um(c)	30.0 um(c)
189.65 min	UP	31898.37	25380.11	16413.73	10563.43	6977.89	3687.74	542.77	258.49
4.21 (psid)	DOWN	1191.89	88.81	11.82	3.44	1.61	0.74	0.08	0.03
	EFF.(%)	96.26	99.65	99.93	99.97	99.98	99.98	99.99	99.99
199.63 min	UP	31750.64	25034.78	16051.08	10266.66	6748.85	3547.92	519.48	247.62
4.61 (psid)	DOWN	1182.94	91.85	12.26	3.40	1.58	0.71	0.08	0.03
	EFF.(%)	96.27	99.63	99.92	99.97	99.98	99.98	99.98	99.99
209.61 min	UP	31794.98	25006.62	15957.23	10146.14	6634.57	3464.75	501.34	236.92
4.89 (psid)	DOWN	1131.49	83.41	11.81	3.49	1.76	0.77	0.09	0.04
	EFF.(%)	96.44	99.67	99.93	99.97	99.97	99.98	99.98	99.98
219.58 min	UP	31786.05	25238.31	16285.83	10442.70	6866.54	3599.06	517.27	244.59
5.10 (psid)	DOWN	953.78	72.86	11.41	3.57	1.79	0.78	0.11	0.04
	EFF.(%)	97.00	99.71	99.93	99.97	99.97	99.98	99.98	99.98
229.57 min	UP	31810.27	25399.71	16497.75	10634.06	7020.65	3690.32	530.49	249.81
5.29 (psid)	DOWN	928.49	72.68	11.87	3.99	2.00	0.87	0.09	0.04
	EFF.(%)	97.08	99.71	99.93	99.96	99.97	99.98	99.98	99.98
239.56 min	UP	31876.11	25559.63	16680.65	10784.62	7137.76	3764.28	545.39	256.70
5.48 (psid)	DOWN	896.06	72.62	12.35	4.09	2.04	0.93	0.11	0.05
	EFF.(%)	97.19	99.72	99.93	99.96	99.97	99.98	99.98	99.98
249.54 min	UP	32065.37	25682.29	16717.60	10782.57	7129.17	3761.47	548.79	259.30
5.68 (psid)	DOWN	992.39	74.30	12.58	4.34	2.22	0.97	0.12	0.06
	EFF.(%)	96.91	99.71	99.92	99.96	99.97	99.97	99.98	99.98
259.51 min	UP	32066.91	25759.87	16819.83	10868.39	7194.57	3798.22	551.42	260.09
5.63 (psid)	DOWN	981.43	74.56	12.92	4.27	2.21	1.01	0.11	0.06
	EFF.(%)	96.94	99.71	99.92	99.96	99.97	99.97	99.98	99.98
269.50 min	UP	31984.12	25375.02	16318.38	10433.78	6852.44	3595.18	523.03	248.29
5.82 (psid)	DOWN	882.08	60.35	11.92	4.30	2.27	1.01	0.13	0.06
	EFF.(%)	97.24	99.76	99.93	99.96	99.97	99.97	99.98	99.98

**TARDEC
FILTER ELEMENT MULTI-PASS TEST REPORT SHEET
ISO/DIS 19438**

P/N :	1R-0749	TEST No. :	MUL00469
ID :	FL12-1105	TEST DATE :	7/12/12

PARTICLE DISTRIBUTION ANALYSIS (PARTICLES/MILLILITER)

Sample Point		4.0 um(c)	6.0 um(c)	8.0 um(c)	10.0 um(c)	12.0 um(c)	15.0 um(c)	25.0 um(c)	30.0 um(c)
279.48 min	UP	31927.97	25448.89	16464.83	10580.57	6974.03	3667.19	531.54	251.03
5.99 (psid)	DOWN	1036.42	69.39	12.86	4.41	2.33	1.04	0.11	0.04
	EFF.(%)	96.75	99.73	99.92	99.96	99.97	99.97	99.98	99.98
289.46 min	UP	31884.64	25271.81	16247.35	10387.33	6815.50	3568.81	516.34	244.37
6.18 (psid)	DOWN	1106.88	68.43	12.77	4.46	2.37	1.05	0.14	0.06
	EFF.(%)	96.53	99.73	99.92	99.96	99.97	99.97	99.97	99.97
299.43 min	UP	32168.81	25661.46	16581.99	10620.68	6984.19	3669.95	534.95	252.23
6.30 (psid)	DOWN	1045.34	63.33	12.59	4.66	2.44	1.06	0.15	0.08
	EFF.(%)	96.75	99.75	99.92	99.96	99.97	99.97	99.97	99.97
309.42 min	UP	32230.09	25864.87	16832.80	10832.96	7152.91	3769.76	549.46	259.87
6.61 (psid)	DOWN	1091.73	66.04	13.07	4.77	2.57	1.10	0.13	0.05
	EFF.(%)	96.61	99.74	99.92	99.96	99.96	99.97	99.98	99.98
319.40 min	UP	32104.43	25748.28	16755.58	10799.19	7127.83	3751.37	545.82	257.95
6.86 (psid)	DOWN	1134.96	66.29	13.35	4.77	2.64	1.16	0.17	0.07
	EFF.(%)	96.46	99.74	99.92	99.96	99.96	99.97	99.97	99.97
329.37 min	UP	32203.69	25994.28	17040.88	11035.96	7319.01	3867.91	564.93	266.81
7.06 (psid)	DOWN	1118.22	69.46	13.95	5.05	2.72	1.17	0.13	0.06
	EFF.(%)	96.53	99.73	99.92	99.95	99.96	99.97	99.98	99.98
339.35 min	UP	32337.83	26034.09	16991.50	10965.25	7256.61	3834.60	563.04	266.23
7.18 (psid)	DOWN	1143.43	66.91	13.67	5.02	2.64	1.19	0.13	0.06
	EFF.(%)	96.46	99.74	99.92	99.95	99.96	99.97	99.98	99.98
349.34 min	UP	32227.52	25866.66	16842.87	10846.58	7161.25	3773.41	548.53	258.16
7.45 (psid)	DOWN	1116.75	70.60	14.24	5.14	2.77	1.27	0.18	0.09
	EFF.(%)	96.53	99.73	99.92	99.95	99.96	99.97	99.97	99.97
359.31 min	UP	32289.27	25797.38	16686.90	10698.53	7044.45	3705.35	538.91	253.93
7.63 (psid)	DOWN	1182.31	69.10	13.94	5.08	2.70	1.23	0.15	0.08
	EFF.(%)	96.34	99.73	99.92	99.95	99.96	99.97	99.97	99.97

**TARDEC
FILTER ELEMENT MULTI-PASS TEST REPORT SHEET
ISO/DIS 19438**

P/N :	1R-0749	TEST No. :	MUL00469
ID :	FL12-1105	TEST DATE :	7/12/12

PARTICLE DISTRIBUTION ANALYSIS (PARTICLES/MILLILITER)

Sample Point		4.0 um(c)	6.0 um(c)	8.0 um(c)	10.0 um(c)	12.0 um(c)	15.0 um(c)	25.0 um(c)	30.0 um(c)
369.29 min	UP	32111.08	25598.24	16538.59	10599.22	6968.34	3661.72	533.47	252.15
7.78 (psid)	DOWN	1097.21	67.21	14.07	5.26	2.87	1.28	0.18	0.08
	EFF.(%)	96.58	99.74	99.91	99.95	99.96	99.96	99.97	99.97
379.28 min	UP	32142.77	25837.68	16847.91	10872.85	7197.63	3799.75	552.13	260.69
7.98 (psid)	DOWN	1104.03	64.96	14.35	5.38	2.86	1.30	0.20	0.08
	EFF.(%)	96.57	99.75	99.91	99.95	99.96	99.97	99.96	99.97
389.26 min	UP	32150.35	25967.76	17043.55	11062.79	7351.79	3895.41	570.23	269.83
8.18 (psid)	DOWN	1082.98	67.57	15.07	5.55	3.02	1.40	0.18	0.09
	EFF.(%)	96.63	99.74	99.91	99.95	99.96	99.96	99.97	99.97
399.23 min	UP	32175.89	26012.58	17089.98	11093.71	7374.81	3906.79	569.23	268.08
8.36 (psid)	DOWN	1057.36	65.51	15.09	5.72	3.04	1.48	0.19	0.10
	EFF.(%)	96.71	99.75	99.91	99.95	99.96	99.96	99.97	99.96
409.22 min	UP	32219.95	26127.54	17231.96	11212.19	7465.79	3963.81	578.73	272.23
8.53 (psid)	DOWN	1043.59	67.94	15.94	6.12	3.30	1.57	0.20	0.09
	EFF.(%)	96.76	99.74	99.91	99.95	99.96	99.96	99.96	99.97
419.21 min	UP	32198.14	26050.43	17128.11	11118.77	7389.61	3917.18	574.30	272.07
8.70 (psid)	DOWN	1020.92	68.05	15.90	6.16	3.23	1.53	0.21	0.10
	EFF.(%)	96.83	99.74	99.91	99.94	99.96	99.96	99.96	99.96
429.18 min	UP	32161.76	25951.55	17002.18	11009.09	7303.54	3864.49	566.52	266.72
8.87 (psid)	DOWN	985.46	68.13	15.89	6.17	3.36	1.57	0.21	0.12
	EFF.(%)	96.94	99.74	99.91	99.94	99.95	99.96	99.96	99.96
439.16 min	UP	32135.00	25856.02	16876.94	10898.31	7215.50	3814.19	557.03	263.17
9.08 (psid)	DOWN	1039.05	69.65	16.29	6.31	3.34	1.58	0.24	0.11
	EFF.(%)	96.77	99.73	99.90	99.94	99.95	99.96	99.96	99.96
449.15 min	UP	32191.78	25923.21	16935.61	10952.74	7256.35	3841.77	566.85	270.55
9.30 (psid)	DOWN	1046.06	73.09	17.01	6.68	3.54	1.58	0.23	0.11
	EFF.(%)	96.75	99.72	99.90	99.94	99.95	99.96	99.96	99.96

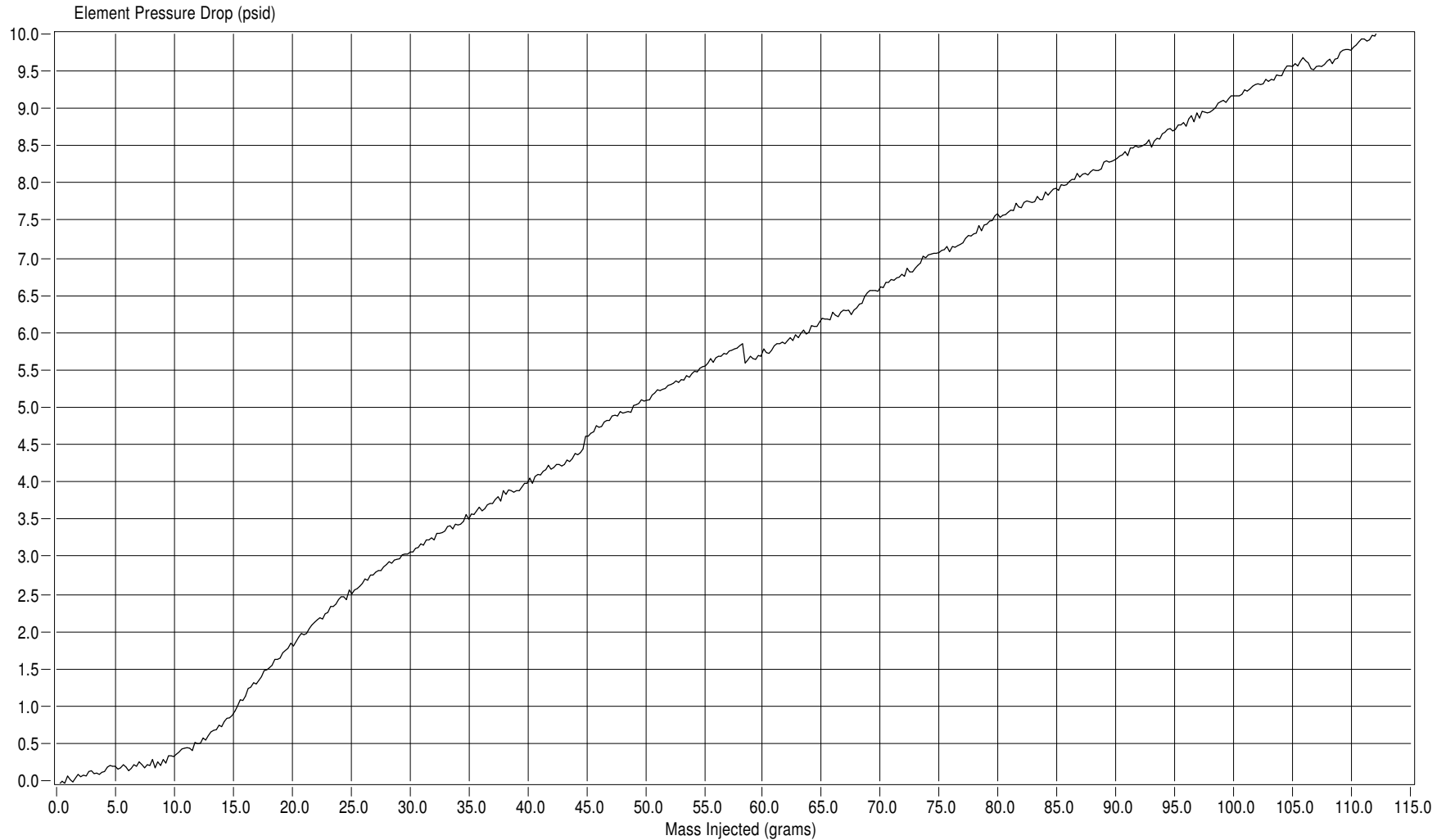
P/N :	1R-0749	TEST No. :	MUL00469
ID :	FL12-1105	TEST DATE :	7/12/12

[illegible]

Differential Pressure Versus Contaminant Added

P/N.: 1R-0749
ID: FL12-1105
TERMINAL (psid): 10.00

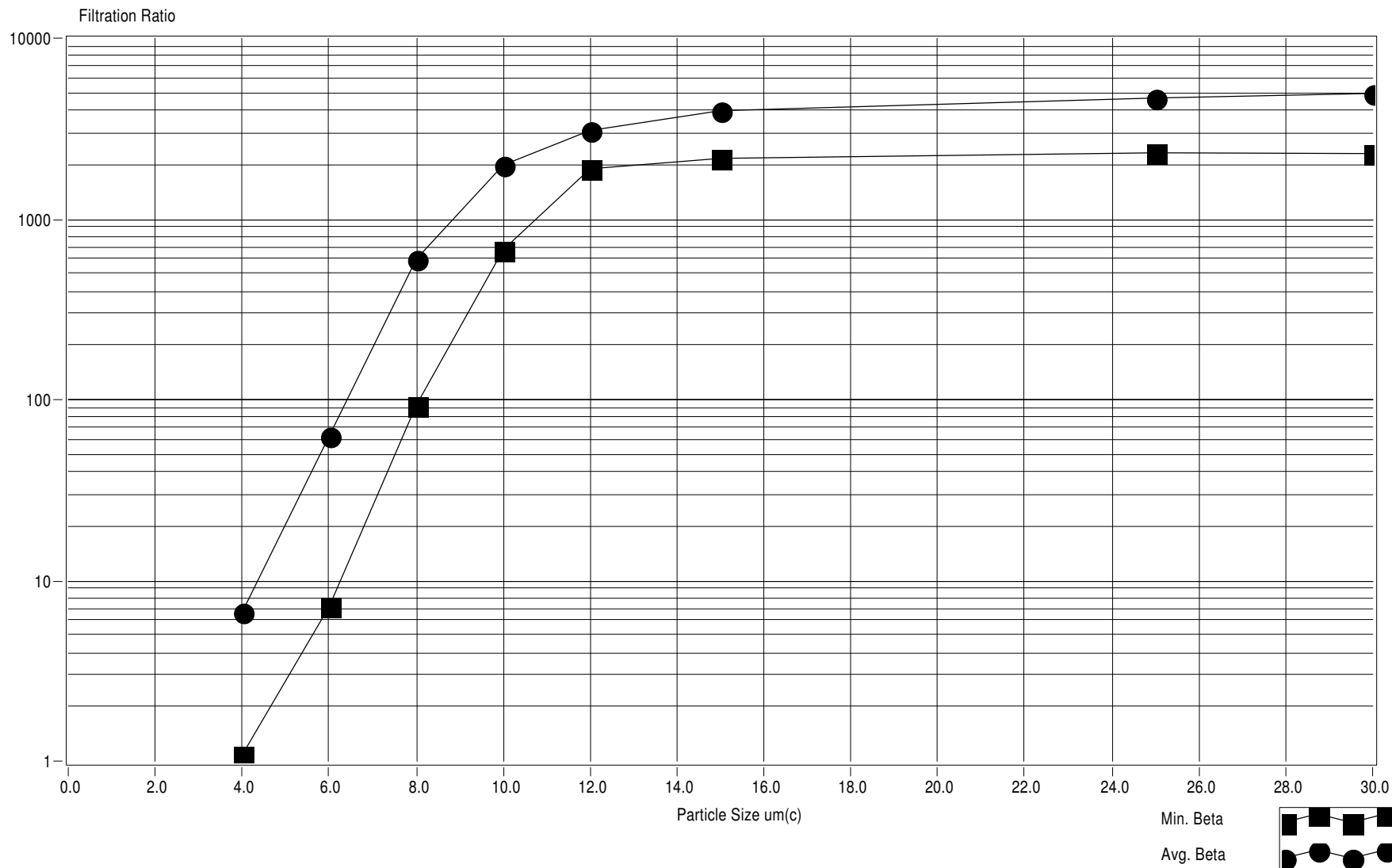
TEST No.: MUL00469
TEST DATE: 7/12/12
OPERATOR: RVL



Filtration Ratio Versus Particle Size

P/N.: 1R-0749
 ID: FL12-1105
 TERMINAL (psid): 10.00

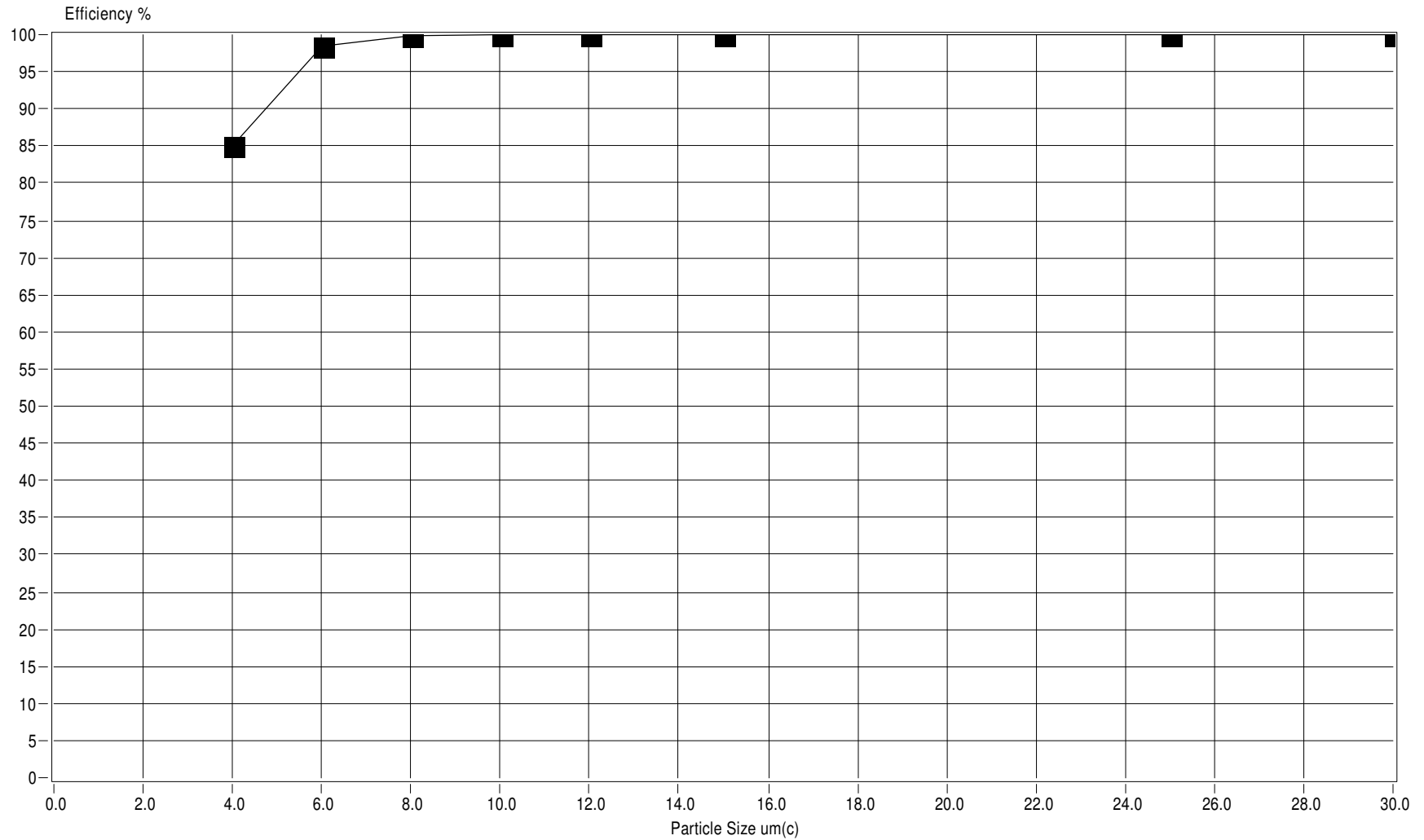
TEST No.: MUL00469
 TEST DATE: 7/12/12
 OPERATOR: RVL



Efficiency Versus Particle Size

P/N.: 1R-0749
ID: FL12-1105
TERMINAL (psid): 10.00

TEST No.: MUL00469
TEST DATE: 7/12/12
OPERATOR: RVL



TARDEC MULTI-PASS TEST DATA SHEET

P/N:	1R-0749
ID:	FL12-1105
Test No.:	MUL00469

P/N:	1R-0749
Element ID:	FL12-1105
Test No.:	MUL00469
Test Date:	7/12/12
Operator:	RVL
Manufacture:	CAT
Element Type:	Spin on
General Inf.:	STRYKER
Project No.:	WD-17
Company:	ARMY
Test Housing ID:	

Element Area (Sq.Inch)	1.000E+0
Capacity (g/Sq.Inch)	111.79
Flux (gpm/Sq.Inch)	1.50
No. of Pleats:	0.00
Pleat Height (Inch)	0.00
Pleat Length (Inch)	0.00
Filter O.D. (Inch)	0.00

Initial Injection Volume [l]:	46.00
Final Injection Volume [l]:	-50.85
Inj. Temperature [oF]:	100.00

Test Fluid Ref:	5606
Batch No.:	4055728
Test Fluid Type:	Shell
Antistatic Type:	Stadis 450
Bubble Point Fluid:	ALCOHOL

Initial System Volume [l]:	14.00
Final System Volume [l]:	14.00
Anti-Static Added [ppm]:	100.00
Temperature [oF]:	100.00
Conductivity [pS/M]:	1500.00
Viscosity[cSt]:	15.00
RH%:	0.00
Flow Rate [gpm]:	1.50
Bubble Point [in. H2O]:	0.00
MIN. BUBBLE POINT [in. H2O]:	0.00

Dust Type:	A-3
Batch No.:	5544Q

Media:

Layer 1 :	
Layer 2 :	
Layer 3 :	
Layer 4 :	
Layer 5 :	
Layer 6 :	
Layer 7 :	

Test Sys. Cleanliness [particle/ml]:	697.578
Inj. Sys.Cleanliness [particle/ml]:	0.000
Approximate Element Capacity [g] :	0.000
Required Inj. Grav. Level [mg/l] :	1135.620
Contaminant Required [g] :	52.239
Calculated Test Time[min] :	0.000
Sensor Flow [ml/min] :	50.000

TARDEC MULTI-PASS TEST DATA SHEET

P/N: 1R-0749
ID: FL12-1105
Test No.: MUL00469

Terminal Pressure [psid]: 10.00
Housing Pressure [psid]: 1.98
Clean Assembly [psid]: 1.92
Clean Filter Media [psid]: -0.06
Net [psid]: 10.06

Dust Injected [g]: 111.79
Dust Retained [g]: 109.88

Base U.G.L [mg/l]: 39.73
Final U.G.L [mg/L]: 52.00

Initial Inj Grav. [mg/l]: 1052.00
Final Inj Grav. [mg/L]: 1256.00

Initial Inj Flow [lpm]: 0.22
Final Inj Flow [lpm]: 0.17

% Assembly	Time at	Time of Count
D.P.	% of Assembly	at % of
	D.P. [min]	Assembly
		D.P. [min]
2.5%	24.43	23.95
5%	49.38	48.91
10%	67.22	66.88
15%	78.18	77.86
20%	91.31	90.83
30%	126.13	125.76
40%	175.88	175.67
80%	377.60	377.28
100%	495.52	495.05

Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
BCK	1.92	1.00	UP	610.53	16.97	2.05	1.12	0.64	0.34	0.02	0.00	49.90	99.94
0		1.00	DOWN	784.62	4.20	0.40	0.18	0.16	0.06	0.02	0.00	49.76	
			BETA	0.78	4.04	5.12	6.22	4.00	5.67	1.00	99999.99		
0.01	1.91	1.00	UP	13211.51	4954.95	1999.61	972.75	535.63	262.51	40.29	20.57	54.59	99.22
1		1.00	DOWN	4161.99	170.07	9.13	1.49	0.63	0.36	0.06	0.02	49.95	
			BETA	3.17	29.13	219.02	652.85	850.21	729.19	671.50	1028.50		
1.00	1.93	1.00	UP	26663.14	13557.58	6162.32	3206.22	1834.43	883.34	123.79	59.18	51.35	98.80
2		1.00	DOWN	12737.86	940.14	50.65	4.52	0.84	0.16	0.04	0.02	49.46	
			BETA	2.09	14.42	121.66	709.34	2183.85	5520.87	3094.75	2959.00		
1.99	1.97	1.00	UP	29569.74	17809.88	8972.80	4944.40	2933.85	1437.04	199.77	92.56	50.18	98.41
3		1.00	DOWN	18052.08	1505.54	79.69	6.15	1.11	0.12	0.00	0.00	49.64	
			BETA	1.64	11.83	112.60	803.97	2643.11	11975.33	99999.99	99999.99		
3.00	1.94	1.00	UP	31146.41	21319.67	11785.52	6841.65	4208.10	2113.83	298.74	140.96	49.31	98.03
4		1.00	DOWN	22113.65	2089.22	109.26	9.31	1.56	0.18	0.00	0.00	50.08	
			BETA	1.41	10.20	107.87	734.87	2697.50	11743.50	99999.99	99999.99		
3.99	2.04	1.00	UP	31765.96	23319.91	13707.25	8234.31	5179.73	2638.53	375.24	174.61	51.60	97.63
5		1.00	DOWN	24595.47	2557.39	133.78	11.39	1.86	0.14	0.00	0.00	49.50	
			BETA	1.29	9.12	102.46	722.94	2784.80	18846.64	99999.99	99999.99		
4.99	1.99	1.00	UP	32542.27	24802.03	15145.25	9346.17	5991.58	3095.87	437.18	202.35	49.24	97.32
6		1.00	DOWN	26494.87	2957.08	159.20	13.44	2.14	0.10	0.02	0.02	49.65	
			BETA	1.23	8.39	95.13	695.40	2799.80	30958.70	21859.00	10117.50		
5.99	1.96	1.00	UP	32031.29	24700.71	15316.94	9561.27	6179.58	3197.74	458.02	214.14	50.02	96.99
7		1.00	DOWN	27501.61	3180.93	164.37	13.41	2.20	0.08	0.00	0.00	49.04	
			BETA	1.16	7.77	93.19	713.00	2808.90	39971.75	99999.99	99999.99		
6.99	2.01	1.00	UP	32414.36	25145.65	15666.28	9816.53	6362.81	3319.16	475.57	223.84	50.71	96.70
8		1.00	DOWN	28126.91	3293.42	169.62	14.54	2.42	0.16	0.02	0.02	49.75	
			BETA	1.15	7.64	92.36	675.14	2629.26	20744.75	23778.50	11192.00		
7.99	2.06	1.00	UP	32122.10	24925.67	15548.43	9739.34	6309.19	3276.71	475.68	223.36	49.46	96.53
9		1.00	DOWN	28548.46	3358.57	167.75	14.13	2.30	0.18	0.02	0.00	50.49	
			BETA	1.13	7.42	92.69	689.27	2743.13	18203.94	23784.00	99999.99		
8.98	2.03	1.00	UP	32406.61	25278.03	15849.42	10017.50	6536.65	3409.98	481.44	223.46	49.59	96.46
10		1.00	DOWN	29002.01	3462.24	173.82	15.22	2.30	0.14	0.00	0.00	50.00	
			BETA	1.12	7.30	91.18	658.18	2842.02	24357.00	99999.99	99999.99		
9.98	2.05	1.00	UP	32235.21	25051.82	15652.52	9834.69	6392.68	3340.45	478.47	226.15	50.39	96.35
11		1.00	DOWN	29178.58	3484.60	174.99	15.26	2.42	0.14	0.00	0.00	50.53	
			BETA	1.10	7.19	89.45	644.48	2641.60	23860.36	99999.99	99999.99		
10.98	2.04	1.00	UP	32430.47	25220.17	15768.65	9925.46	6466.61	3378.51	487.46	228.75	49.97	96.31
12		1.00	DOWN	29535.25	3530.15	170.51	14.54	2.31	0.18	0.00	0.00	50.34	
			BETA	1.10	7.14	92.48	682.63	2799.40	18769.50	99999.99	99999.99		
11.98	2.10	1.00	UP	32336.38	25043.58	15555.13	9766.05	6338.10	3301.69	481.02	225.32	50.57	96.20
13		1.00	DOWN	29495.95	3494.17	169.92	14.80	1.97	0.18	0.00	0.00	49.76	
			BETA	1.10	7.17	91.54	659.87	3217.31	18342.72	99999.99	99999.99		
12.97	2.11	1.00	UP	32549.58	25150.35	15580.67	9766.16	6342.33	3302.68	476.89	223.53	49.84	96.13
14		1.00	DOWN	29638.91	3519.29	170.51	14.69	2.66	0.22	0.02	0.02	49.75	
			BETA	1.10	7.15	91.38	664.82	2384.33	15012.18	23844.50	11176.50		

P/N:	1R-0749	Test No.:	MUL00469	Page #	3
ID:	FL12-1105	Test Date:	7/12/12		

Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
13.97	2.07	1.00	UP	32784.42	25298.38	15623.85	9755.14	6325.07	3298.88	474.31	221.98	50.31	96.06
15		1.00	DOWN	29750.59	3467.37	166.53	13.71	2.32	0.08	0.04	0.02	50.74	
			BETA	1.10	7.30	93.82	711.53	2726.32	41236.00	11857.75	11099.00		
14.97	2.08	1.00	UP	32579.41	25245.34	15663.08	9790.28	6362.36	3322.09	484.28	228.73	49.88	96.01
16		1.00	DOWN	29947.50	3502.82	167.75	15.33	2.59	0.20	0.02	0.02	50.82	
			BETA	1.09	7.21	93.37	638.64	2456.51	16610.45	24214.00	11436.50		
15.97	2.06	1.00	UP	32812.67	25540.99	15946.73	10008.81	6511.18	3398.56	493.29	231.27	49.70	95.94
17		1.00	DOWN	30096.73	3568.46	171.71	13.84	2.15	0.10	0.00	0.00	49.99	
			BETA	1.09	7.16	92.87	723.18	3028.46	33985.60	99999.99	99999.99		
16.97	2.09	1.00	UP	32884.82	25630.00	16034.28	10092.28	6566.81	3444.46	494.91	229.29	50.76	95.93
18		1.00	DOWN	30130.18	3565.82	168.96	14.78	2.46	0.20	0.02	0.00	49.65	
			BETA	1.09	7.19	94.90	682.83	2669.43	17222.30	24745.50	99999.99		
17.96	2.10	1.00	UP	32742.43	25600.29	16064.61	10122.79	6596.51	3453.23	502.64	235.16	49.97	95.89
19		1.00	DOWN	30085.67	3566.46	169.61	15.60	2.55	0.14	0.00	0.00	49.81	
			BETA	1.09	7.18	94.71	648.90	2586.87	24665.93	99999.99	99999.99		
18.97	2.16	1.00	UP	32783.47	25457.41	15820.07	9904.38	6431.00	3353.82	486.05	228.32	50.46	95.87
20		1.00	DOWN	30127.67	3545.97	165.08	14.19	2.68	0.20	0.00	0.00	50.51	
			BETA	1.09	7.18	95.83	697.98	2399.63	16769.10	99999.99	99999.99		
19.96	2.18	1.00	UP	32771.73	25333.69	15679.87	9790.04	6344.13	3302.68	481.20	221.41	50.11	95.87
21		1.00	DOWN	30236.13	3488.64	166.11	14.65	2.43	0.24	0.02	0.00	50.73	
			BETA	1.08	7.26	94.39	668.26	2610.75	13761.17	24060.00	99999.99		
20.96	2.17	1.00	UP	32703.15	25275.51	15636.09	9753.89	6325.85	3295.97	478.78	222.47	50.38	95.86
22		1.00	DOWN	29985.63	3409.93	156.54	12.92	2.03	0.18	0.00	0.00	49.48	
			BETA	1.09	7.41	99.89	754.95	3116.18	18310.94	99999.99	99999.99		
21.95	2.17	1.00	UP	32823.96	25522.35	15907.21	9983.53	6485.47	3382.43	488.51	229.78	49.36	95.85
23		1.00	DOWN	30091.35	3435.72	158.78	13.45	1.91	0.16	0.00	0.00	49.77	
			BETA	1.09	7.43	100.18	742.27	3395.53	21140.19	99999.99	99999.99		
22.96	2.13	1.00	UP	32660.55	25327.98	15745.43	9861.88	6400.13	3337.43	484.73	227.58	50.21	95.85
24		1.00	DOWN	30213.43	3423.62	154.42	13.46	1.92	0.18	0.00	0.00	50.81	
			BETA	1.08	7.40	101.96	732.68	3333.40	18541.28	99999.99	99999.99		
23.95	2.15	1.00	UP	32743.93	25362.57	15745.83	9846.77	6376.98	3336.32	480.99	221.36	50.21	95.85
25		1.00	DOWN	30151.26	3371.30	155.48	13.35	1.99	0.18	0.00	0.00	49.48	
			BETA	1.09	7.52	101.27	737.59	3204.51	18535.11	99999.99	99999.99		
24.96	2.19	1.00	UP	32500.83	25194.46	15703.50	9850.91	6399.77	3346.32	485.13	230.01	48.93	95.83
26		1.00	DOWN	30039.33	3324.61	152.31	12.46	1.99	0.12	0.00	0.00	49.59	
			BETA	1.08	7.58	103.10	790.60	3215.96	27886.00	99999.99	99999.99		
25.95	2.16	1.00	UP	32583.61	25252.76	15750.38	9913.94	6453.03	3365.81	488.85	226.12	50.64	95.83
27		1.00	DOWN	30102.26	3320.23	146.26	12.86	2.10	0.12	0.00	0.00	49.86	
			BETA	1.08	7.61	107.69	770.91	3072.87	28048.42	99999.99	99999.99		
26.95	2.11	1.00	UP	32316.69	25108.96	15669.12	9876.98	6440.97	3366.97	488.51	227.32	49.73	95.82
28		1.00	DOWN	30015.00	3278.84	145.68	11.83	2.01	0.12	0.02	0.02	50.16	
			BETA	1.08	7.66	107.56	834.91	3204.46	28058.08	24425.50	11366.00		
27.94	2.14	1.00	UP	32401.38	25210.23	15772.74	9949.55	6492.86	3403.06	499.95	236.48	50.05	95.80
29		1.00	DOWN	30113.85	3264.25	145.72	12.35	1.72	0.16	0.00	0.00	50.72	
			BETA	1.08	7.72	108.24	805.63	3774.92	21269.12	99999.99	99999.99		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
28.95	2.19	1.00	UP	32397.06	25190.28	15752.46	9921.18	6478.85	3392.53	491.97	229.92	50.24	95.77
30		1.00	DOWN	30031.53	3220.13	141.44	12.69	1.94	0.16	0.00	0.00	49.34	
			BETA	1.08	7.82	111.37	781.81	3339.61	21203.31	99999.99	99999.99		
29.94	2.17	1.00	UP	32588.51	25370.61	15863.70	9992.10	6488.67	3387.53	491.35	231.59	49.68	95.76
31		1.00	DOWN	29827.48	3140.12	136.69	11.81	1.79	0.24	0.00	0.00	49.54	
			BETA	1.09	8.08	116.06	846.07	3624.96	14114.71	99999.99	99999.99		
30.95	2.23	1.00	UP	32532.20	25337.72	15809.82	9960.27	6493.75	3395.91	494.13	231.59	49.86	95.75
32		1.00	DOWN	29836.48	3077.15	135.69	12.09	2.08	0.14	0.00	0.00	49.73	
			BETA	1.09	8.23	116.51	823.84	3122.00	24256.50	99999.99	99999.99		
31.94	2.19	1.00	UP	32706.06	25455.86	15923.80	10008.47	6522.09	3411.29	493.14	229.63	50.07	95.71
33		1.00	DOWN	29947.46	3051.65	130.73	10.57	1.76	0.12	0.00	0.00	50.66	
			BETA	1.09	8.34	121.81	946.88	3705.73	28427.42	99999.99	99999.99		
32.94	2.15	1.00	UP	32608.35	25166.75	15569.84	9728.40	6294.45	3283.31	474.54	225.42	50.22	95.70
34		1.00	DOWN	29743.24	2920.23	125.51	10.55	1.82	0.22	0.02	0.02	50.05	
			BETA	1.10	8.62	124.05	922.12	3458.49	14924.14	23727.00	11271.00		
33.95	2.19	1.00	UP	32697.82	25292.05	15688.44	9812.31	6360.39	3310.07	480.72	226.89	49.34	95.72
35		1.00	DOWN	29471.51	2828.19	118.95	9.39	1.27	0.08	0.00	0.00	49.31	
			BETA	1.11	8.94	131.89	1044.97	5008.18	41375.87	99999.99	99999.99		
34.94	2.18	1.00	UP	32639.59	25212.54	15623.52	9762.55	6322.21	3298.08	477.41	223.81	50.87	95.69
36		1.00	DOWN	29432.68	2775.71	119.84	10.64	1.75	0.12	0.00	0.00	49.82	
			BETA	1.11	9.08	130.37	917.53	3612.69	27484.00	99999.99	99999.99		
35.93	2.26	1.00	UP	32880.88	25621.82	16052.33	10119.37	6593.23	3447.02	493.70	231.39	49.60	95.67
37		1.00	DOWN	29404.76	2753.95	114.88	9.72	1.56	0.18	0.00	0.00	50.70	
			BETA	1.12	9.30	139.73	1041.09	4226.43	19150.11	99999.99	99999.99		
36.93	2.15	1.00	UP	32553.58	25287.64	15761.99	9903.24	6434.85	3351.08	483.31	227.76	50.31	95.67
38		1.00	DOWN	29290.07	2663.99	112.70	9.31	1.42	0.08	0.00	0.00	50.47	
			BETA	1.11	9.49	139.86	1063.72	4531.58	41888.50	99999.99	99999.99		
37.93	2.23	1.00	UP	32698.58	25420.80	15879.28	9967.33	6494.98	3397.04	485.49	227.35	50.49	95.65
39		1.00	DOWN	29113.59	2606.98	105.43	8.81	1.43	0.06	0.00	0.00	50.39	
			BETA	1.12	9.75	150.61	1131.37	4541.94	56617.33	99999.99	99999.99		
38.93	2.18	1.00	UP	32605.90	25419.48	15915.70	10033.46	6536.65	3417.98	496.95	233.51	49.81	95.66
40		1.00	DOWN	29041.71	2545.86	107.83	8.44	1.50	0.20	0.00	0.00	49.63	
			BETA	1.12	9.98	147.60	1188.80	4357.77	17089.90	99999.99	99999.99		
39.92	2.26	1.00	UP	32652.28	25447.52	15925.18	10044.59	6553.58	3436.21	498.86	232.64	49.95	95.66
41		1.00	DOWN	28718.46	2437.95	97.39	8.72	1.49	0.06	0.00	0.00	49.03	
			BETA	1.14	10.44	163.52	1151.90	4398.38	57270.17	99999.99	99999.99		
40.93	2.21	1.00	UP	32650.22	25468.57	15978.57	10093.34	6586.26	3447.76	502.24	234.85	50.31	95.68
42		1.00	DOWN	28697.05	2393.85	98.54	7.88	0.89	0.06	0.00	0.00	50.92	
			BETA	1.14	10.64	162.15	1280.88	7400.29	57462.67	99999.99	99999.99		
41.92	2.31	1.00	UP	32505.65	25372.96	15944.44	10060.97	6570.76	3455.35	509.03	240.37	50.19	95.69
43		1.00	DOWN	28460.14	2326.70	95.27	8.02	1.49	0.10	0.02	0.02	50.71	
			BETA	1.14	10.91	167.36	1254.49	4409.91	34553.50	25451.50	12018.50		
42.92	2.31	1.00	UP	32620.03	25543.66	16122.36	10210.31	6676.54	3502.32	501.70	236.09	50.10	95.70
44		1.00	DOWN	28322.77	2269.34	91.86	8.46	1.42	0.12	0.04	0.04	49.75	
			BETA	1.15	11.26	175.51	1206.89	4701.79	29186.00	12542.50	5902.25		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
43.93	2.30	1.00	UP	32476.03	25490.84	16112.77	10191.22	6664.27	3501.25	509.47	238.91	51.02	95.77
45		1.00	DOWN	27972.07	2186.77	88.73	7.00	1.15	0.08	0.00	0.00	49.89	
			BETA	1.16	11.66	181.59	1455.89	5795.02	43765.62	99999.99	99999.99		
44.92	2.33	1.00	UP	32585.96	25478.60	16039.76	10136.06	6608.06	3470.90	498.59	235.31	49.67	95.81
46		1.00	DOWN	27747.45	2065.32	84.60	6.81	1.09	0.08	0.00	0.00	49.98	
			BETA	1.17	12.34	189.60	1488.41	6062.44	43386.25	99999.99	99999.99		
45.91	2.36	1.00	UP	32537.38	25463.22	16065.73	10167.59	6651.10	3475.66	505.71	241.59	49.96	95.86
47		1.00	DOWN	27452.44	1982.93	79.85	6.23	0.97	0.08	0.00	0.00	50.08	
			BETA	1.19	12.84	201.20	1632.04	6856.80	43445.75	99999.99	99999.99		
46.92	2.40	1.00	UP	32483.02	25273.94	15854.76	10006.95	6525.58	3417.26	492.03	232.43	49.16	95.89
48		1.00	DOWN	27069.62	1878.01	74.79	6.96	1.17	0.08	0.00	0.00	50.06	
			BETA	1.20	13.46	211.99	1437.78	5577.42	42715.75	99999.99	99999.99		
47.91	2.41	1.00	UP	32166.66	24926.58	15547.06	9755.36	6351.95	3326.25	482.57	226.17	50.65	95.91
49		1.00	DOWN	26585.43	1756.24	69.03	5.31	1.09	0.12	0.02	0.02	49.99	
			BETA	1.21	14.19	225.22	1837.17	5827.48	27718.75	24128.50	11308.50		
48.91	2.42	1.00	UP	32571.08	25233.91	15778.27	9927.12	6465.39	3389.07	500.06	233.69	49.83	95.93
50		1.00	DOWN	26110.38	1654.32	67.57	5.89	0.91	0.18	0.00	0.00	50.19	
			BETA	1.25	15.25	233.51	1685.42	7104.82	18828.17	99999.99	99999.99		
49.90	2.41	1.00	UP	32217.41	25132.12	15781.39	9943.94	6480.69	3388.18	490.97	231.97	49.83	95.96
51		1.00	DOWN	25800.52	1600.55	65.52	5.41	0.95	0.08	0.00	0.00	50.20	
			BETA	1.25	15.70	240.86	1838.07	6821.78	42352.25	99999.99	99999.99		
50.91	2.38	1.00	UP	32405.98	25232.37	15842.36	9979.25	6502.25	3396.13	496.73	232.27	49.65	95.98
52		1.00	DOWN	25295.77	1509.22	59.40	5.04	1.15	0.18	0.00	0.00	49.68	
			BETA	1.28	16.72	266.71	1980.01	5654.13	18867.39	99999.99	99999.99		
51.90	2.49	1.00	UP	32042.09	24954.12	15712.94	9929.51	6471.53	3382.32	492.42	229.42	50.22	96.02
53		1.00	DOWN	24805.65	1421.91	59.69	5.17	0.87	0.22	0.02	0.00	49.76	
			BETA	1.29	17.55	263.24	1920.60	7438.54	15374.18	24621.00	99999.99		
52.91	2.47	1.00	UP	32107.51	24858.00	15575.90	9809.63	6381.33	3321.32	478.84	227.29	49.98	96.04
54		1.00	DOWN	24208.12	1331.52	55.83	5.13	1.11	0.14	0.02	0.00	49.65	
			BETA	1.33	18.67	278.99	1912.21	5748.95	23723.71	23942.00	99999.99		
53.90	2.48	1.00	UP	31985.68	24461.39	15120.39	9454.92	6122.13	3176.88	459.62	215.12	50.67	96.06
55		1.00	DOWN	23274.24	1207.41	51.51	4.78	1.07	0.12	0.00	0.00	49.75	
			BETA	1.37	20.26	293.54	1978.02	5721.62	26474.00	99999.99	99999.99		
54.90	2.55	1.00	UP	31777.17	24237.80	14928.85	9291.57	6006.60	3112.23	449.25	215.11	49.91	96.07
56		1.00	DOWN	22642.42	1137.43	50.16	5.21	0.97	0.12	0.04	0.02	50.11	
			BETA	1.40	21.31	297.62	1783.41	6192.37	25935.25	11231.25	10755.50		
55.90	2.52	1.00	UP	31937.00	24585.98	15298.87	9603.27	6240.45	3256.14	477.79	226.62	49.79	96.09
57		1.00	DOWN	21945.60	1084.35	48.85	4.46	0.97	0.12	0.04	0.02	49.89	
			BETA	1.46	22.67	313.18	2153.20	6433.45	27134.50	11944.75	11331.00		
56.89	2.58	1.00	UP	31913.79	24642.41	15351.76	9643.49	6267.60	3269.01	477.52	224.90	49.87	96.11
58		1.00	DOWN	21353.89	1025.42	46.87	4.56	1.09	0.10	0.02	0.02	50.05	
			BETA	1.49	24.03	327.54	2114.80	5750.09	32690.10	23876.00	11245.00		
57.90	2.63	1.00	UP	32047.66	24726.97	15396.53	9667.17	6285.20	3284.55	479.60	224.62	50.29	96.16
59		1.00	DOWN	20495.17	957.21	45.61	4.84	1.01	0.16	0.00	0.00	49.91	
			BETA	1.56	25.83	337.57	1997.35	6222.97	20528.44	99999.99	99999.99		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
58.89	2.65	1.00	UP	32162.63	24984.72	15660.26	9858.59	6423.82	3365.61	491.00	232.43	49.81	96.25
60		1.00	DOWN	19758.59	917.61	42.99	4.89	1.17	0.20	0.00	0.00	50.31	
			BETA	1.63	27.23	364.28	2016.07	5490.44	16828.05	99999.99	99999.99		
59.89	2.66	1.00	UP	32260.17	25154.98	15844.28	9980.48	6503.43	3401.63	487.86	231.32	50.51	96.27
61		1.00	DOWN	18925.25	852.11	41.36	4.42	1.19	0.28	0.02	0.00	50.53	
			BETA	1.70	29.52	383.08	2258.03	5465.07	12148.68	24393.00	99999.99		
60.88	2.72	1.00	UP	32134.73	24983.48	15680.13	9875.68	6434.94	3362.21	492.88	232.94	49.05	96.30
62		1.00	DOWN	18011.17	806.43	40.54	4.11	0.93	0.18	0.00	0.00	50.07	
			BETA	1.78	30.98	386.78	2402.84	6919.29	18678.94	99999.99	99999.99		
61.89	2.70	1.00	UP	32026.99	24616.99	15293.39	9568.85	6194.03	3220.44	471.60	223.54	50.82	96.36
63		1.00	DOWN	16841.48	753.56	39.12	4.00	1.03	0.32	0.02	0.02	49.94	
			BETA	1.90	32.67	390.94	2392.21	6013.62	10063.87	23580.00	11177.00		
62.88	2.77	1.00	UP	31894.23	24631.52	15348.76	9624.42	6241.55	3259.61	476.29	222.97	49.06	96.43
64		1.00	DOWN	15892.89	709.73	37.89	4.49	1.27	0.38	0.00	0.00	49.53	
			BETA	2.01	34.71	405.09	2143.52	4914.61	8577.92	99999.99	99999.99		
63.88	2.81	1.00	UP	32159.05	25069.39	15836.47	10017.86	6531.71	3405.34	499.07	236.89	49.95	96.48
65		1.00	DOWN	15140.69	680.73	37.60	4.14	1.13	0.42	0.08	0.04	49.88	
			BETA	2.12	36.83	421.18	2419.77	5780.27	8107.95	6238.37	5922.25		
64.88	2.82	1.00	UP	31918.18	24767.19	15556.90	9784.35	6360.94	3318.61	485.53	225.60	49.24	96.52
66		1.00	DOWN	14135.46	644.07	37.72	4.38	1.13	0.40	0.04	0.02	49.86	
			BETA	2.26	38.45	412.43	2233.87	5629.15	8296.52	12138.25	11280.00		
65.88	2.85	1.00	UP	32107.26	24758.39	15431.89	9653.26	6267.26	3268.59	472.63	225.30	48.52	96.61
67		1.00	DOWN	13038.61	601.62	34.97	3.90	1.07	0.26	0.02	0.00	49.97	
			BETA	2.46	41.15	441.29	2475.19	5857.25	12571.50	23631.50	99999.99		
66.88	2.91	1.00	UP	31877.17	24574.81	15283.74	9587.35	6212.71	3241.58	478.77	230.55	50.42	96.66
68		1.00	DOWN	12155.36	566.90	34.45	3.90	1.01	0.20	0.02	0.00	50.04	
			BETA	2.62	43.35	443.65	2458.29	6151.20	16207.90	23938.50	99999.99		
67.88	2.98	1.00	UP	31942.98	24748.83	15517.13	9763.28	6332.24	3297.30	475.60	223.36	49.56	96.70
69		1.00	DOWN	11702.89	570.12	34.77	4.06	1.11	0.30	0.04	0.04	50.10	
			BETA	2.73	43.41	446.28	2404.75	5704.72	10991.00	11890.00	5584.00		
68.87	3.06	1.00	UP	31758.96	24359.86	15107.50	9416.51	6088.98	3158.45	459.83	213.37	50.51	96.75
70		1.00	DOWN	10724.32	528.32	33.43	3.98	0.91	0.34	0.02	0.02	49.95	
			BETA	2.96	46.11	451.91	2365.96	6691.19	9289.56	22991.50	10668.50		
69.87	3.05	1.00	UP	31725.70	24530.51	15331.08	9635.28	6245.96	3254.29	472.79	221.62	49.58	96.84
71		1.00	DOWN	9907.74	489.05	32.62	4.09	0.91	0.30	0.00	0.00	50.02	
			BETA	3.20	50.16	469.99	2355.81	6863.69	10847.63	99999.99	99999.99		
70.86	3.11	1.00	UP	31699.29	24120.49	14804.96	9189.93	5909.41	3054.36	439.42	209.64	50.55	96.88
72		1.00	DOWN	9251.69	464.14	30.87	3.57	0.89	0.30	0.04	0.02	50.02	
			BETA	3.43	51.97	479.59	2574.21	6639.79	10181.20	10985.50	10482.00		
71.87	3.21	1.00	UP	31907.35	24396.60	15071.02	9390.53	6060.40	3147.82	465.17	218.59	51.01	96.92
73		1.00	DOWN	8569.83	442.69	31.88	4.24	1.21	0.44	0.06	0.00	49.96	
			BETA	3.72	55.11	472.74	2214.75	5008.60	7154.14	7752.83	99999.99		
72.86	3.23	1.00	UP	31785.55	24239.13	14931.76	9275.82	5974.78	3099.10	451.48	211.71	50.33	97.01
74		1.00	DOWN	7971.25	415.69	29.71	3.39	0.99	0.26	0.06	0.00	49.99	
			BETA	3.99	58.31	502.58	2736.23	6035.13	11919.62	7524.67	99999.99		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
73.87	3.29	1.00	UP	31747.46	24230.47	14945.66	9304.97	5994.73	3105.84	453.19	215.56	50.22	97.05
75		1.00	DOWN	7518.51	403.32	27.79	3.80	1.09	0.32	0.02	0.02	50.00	
			BETA	4.22	60.08	537.81	2448.68	5499.75	9705.75	22659.50	10778.00		
74.86	3.27	1.00	UP	31741.39	24210.79	14916.70	9267.14	5963.85	3098.24	446.08	208.86	50.50	97.09
76		1.00	DOWN	7112.02	387.14	27.34	3.67	1.05	0.30	0.02	0.00	49.87	
			BETA	4.46	62.54	545.60	2525.11	5679.86	10327.47	22304.00	99999.99		
75.86	3.32	1.00	UP	31799.41	24538.66	15325.93	9601.43	6212.49	3235.61	474.67	228.91	50.66	97.12
77		1.00	DOWN	6837.66	376.05	26.79	3.21	1.01	0.22	0.02	0.00	50.00	
			BETA	4.65	65.25	572.08	2991.10	6150.98	14707.32	23733.50	99999.99		
76.85	3.37	1.00	UP	31277.13	23823.33	14692.29	9162.56	5926.79	3063.52	441.52	208.36	49.13	97.17
78		1.00	DOWN	6496.45	366.93	27.10	3.87	1.15	0.26	0.02	0.00	50.30	
			BETA	4.81	64.93	542.15	2367.59	5153.73	11782.77	22076.00	99999.99		
77.86	3.45	1.00	UP	31426.89	23994.65	14830.47	9247.31	5968.80	3085.94	441.25	209.35	49.84	97.27
79		1.00	DOWN	6092.98	348.64	25.90	3.62	0.73	0.12	0.00	0.00	50.20	
			BETA	5.16	68.82	572.61	2554.51	8176.44	25716.17	99999.99	99999.99		
78.85	3.46	1.00	UP	31484.53	24350.58	15265.08	9620.82	6257.66	3239.70	462.21	218.24	48.92	97.30
80		1.00	DOWN	5862.16	329.71	25.72	3.49	1.21	0.40	0.00	0.00	50.08	
			BETA	5.37	73.85	593.51	2756.68	5171.62	8099.25	99999.99	99999.99		
79.85	3.49	1.00	UP	31251.15	24101.66	15060.58	9486.63	6174.97	3212.98	459.01	219.45	48.97	97.35
81		1.00	DOWN	5720.42	325.71	25.09	2.83	0.63	0.18	0.00	0.00	49.57	
			BETA	5.46	74.00	600.26	3352.17	9801.54	17849.89	99999.99	99999.99		
80.84	3.52	1.00	UP	31517.16	24409.20	15303.75	9657.71	6275.56	3254.13	473.18	223.48	50.93	97.41
82		1.00	DOWN	5568.40	320.82	24.79	3.19	0.99	0.24	0.00	0.00	49.99	
			BETA	5.66	76.08	617.34	3027.50	6338.95	13558.88	99999.99	99999.99		
81.85	3.60	1.00	UP	31619.27	24590.34	15504.57	9803.96	6397.04	3334.21	480.63	225.28	49.29	97.50
83		1.00	DOWN	5335.81	313.72	23.93	3.43	0.87	0.28	0.04	0.02	49.68	
			BETA	5.93	78.38	647.91	2858.30	7352.92	11907.89	12015.75	11264.00		
82.84	3.60	1.00	UP	31451.32	24406.69	15350.57	9677.66	6315.79	3294.49	479.39	228.64	49.90	97.55
84		1.00	DOWN	5204.70	307.78	24.81	3.90	1.17	0.50	0.12	0.10	49.89	
			BETA	6.04	79.30	618.73	2481.45	5398.11	6588.98	3994.92	2286.40		
83.85	3.62	1.00	UP	31478.57	24303.03	15189.94	9549.58	6186.79	3212.50	461.51	218.36	49.52	97.59
85		1.00	DOWN	4949.60	286.74	22.14	3.09	0.85	0.32	0.02	0.02	49.76	
			BETA	6.36	84.76	686.09	3090.48	7278.58	10039.06	23075.50	10918.00		
84.84	3.69	1.00	UP	31306.15	24142.68	15106.75	9513.95	6181.21	3220.66	459.73	216.92	50.27	97.69
86		1.00	DOWN	4763.84	278.89	21.98	3.50	1.17	0.32	0.02	0.00	50.08	
			BETA	6.57	86.57	687.30	2718.27	5283.09	10064.56	22986.50	99999.99		
85.84	3.72	1.00	UP	31313.72	24274.50	15264.48	9634.55	6283.13	3260.33	466.00	217.07	50.60	97.73
87		1.00	DOWN	4774.18	287.11	22.67	3.31	1.09	0.34	0.02	0.02	49.97	
			BETA	6.56	84.55	673.33	2910.74	5764.34	9589.21	23300.00	10853.50		
86.83	3.75	1.00	UP	31295.92	24396.19	15438.88	9801.99	6395.28	3335.04	478.96	228.04	49.65	97.81
88		1.00	DOWN	4554.15	269.26	21.39	3.07	1.05	0.30	0.02	0.02	50.14	
			BETA	6.87	90.60	721.78	3192.83	6090.74	11116.80	23948.00	11402.00		
87.84	3.82	1.00	UP	31430.99	24632.22	15709.15	10020.49	6549.60	3415.56	489.40	230.06	50.84	97.89
89		1.00	DOWN	4514.62	265.09	20.90	3.05	0.79	0.24	0.02	0.00	49.97	
			BETA	6.96	92.92	751.63	3285.41	8290.63	14231.50	24470.00	99999.99		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
88.83	3.78	1.00	UP	31197.71	24472.91	15610.57	9986.38	6537.46	3406.18	486.80	230.22	50.63	97.96
90		1.00	DOWN	4447.50	262.49	20.50	2.73	0.99	0.36	0.04	0.04	50.14	
			BETA	7.01	93.23	761.49	3658.01	6603.49	9461.61	12170.00	5755.50		
89.84	3.84	1.00	UP	31574.57	24847.77	15848.56	10099.55	6631.19	3474.42	502.03	238.23	49.75	97.98
91		1.00	DOWN	4304.29	257.21	21.24	2.80	0.97	0.36	0.04	0.00	50.08	
			BETA	7.34	96.60	746.17	3606.98	6836.28	9651.17	12550.75	99999.99		
90.83	3.90	1.00	UP	31789.66	24729.12	15582.68	9846.34	6409.29	3338.07	488.23	227.21	49.69	98.09
92		1.00	DOWN	4287.70	256.63	21.06	3.01	0.97	0.26	0.00	0.00	49.99	
			BETA	7.41	96.36	739.92	3271.21	6607.52	12838.73	99999.99	99999.99		
91.82	3.95	1.00	UP	31405.72	24294.32	15221.96	9581.91	6219.13	3231.91	472.37	223.72	49.92	98.13
93		1.00	DOWN	4033.68	238.43	20.50	2.93	1.03	0.24	0.02	0.00	50.02	
			BETA	7.79	101.89	742.53	3270.28	6037.99	13466.29	23618.50	99999.99		
92.83	3.93	1.00	UP	31834.19	25198.87	16181.12	10367.40	6824.20	3588.90	517.60	245.06	50.18	98.20
94		1.00	DOWN	3744.65	217.35	17.70	2.53	0.83	0.30	0.02	0.02	49.98	
			BETA	8.50	115.94	914.19	4097.79	8221.93	11963.00	25880.00	12253.00		
93.82	3.95	1.00	UP	31783.06	25530.44	16757.28	10892.23	7245.14	3831.30	553.95	259.14	49.85	98.21
95		1.00	DOWN	3900.54	225.00	19.08	2.83	1.01	0.26	0.04	0.00	49.98	
			BETA	8.15	113.47	878.26	3848.84	7173.41	14735.77	13848.75	99999.99		
94.82	4.01	1.00	UP	31545.53	25234.87	16438.61	10623.14	7042.17	3722.65	533.01	252.09	50.85	98.26
96		1.00	DOWN	3954.91	234.77	19.88	3.35	1.05	0.42	0.04	0.02	50.08	
			BETA	7.98	107.49	826.89	3171.09	6706.83	8863.45	13325.25	12604.50		
95.81	4.06	1.00	UP	31656.89	24954.39	15972.84	10202.08	6694.11	3517.08	514.36	242.48	49.96	98.30
97		1.00	DOWN	3792.71	224.19	19.25	3.09	0.93	0.30	0.04	0.00	49.69	
			BETA	8.35	111.31	829.76	3301.64	7197.97	11723.60	12859.00	99999.99		
96.82	4.10	1.00	UP	31496.45	24812.23	15898.19	10167.27	6683.70	3507.53	507.28	240.68	51.28	98.34
98		1.00	DOWN	3746.42	224.69	18.93	3.27	1.05	0.28	0.00	0.00	49.98	
			BETA	8.41	110.43	839.84	3109.26	6365.43	12526.89	99999.99	99999.99		
97.81	4.13	1.00	UP	31478.04	24914.13	16046.92	10306.74	6796.34	3564.25	515.00	240.21	50.01	98.38
99		1.00	DOWN	3633.21	217.20	17.76	3.09	0.93	0.32	0.10	0.02	49.97	
			BETA	8.66	114.71	903.54	3335.51	7307.89	11138.28	5150.00	12010.50		
98.81	4.16	1.00	UP	31446.35	24767.28	15866.52	10135.28	6650.33	3487.80	507.86	236.16	50.04	98.43
100		1.00	DOWN	3574.60	214.97	19.23	3.17	1.03	0.46	0.00	0.00	49.99	
			BETA	8.80	115.21	825.09	3197.25	6456.63	7582.17	99999.99	99999.99		
99.82	4.14	1.00	UP	31565.50	24743.12	15723.58	9994.39	6533.15	3416.83	492.19	233.17	49.75	98.43
101		1.00	DOWN	3404.20	204.19	17.77	2.30	0.79	0.22	0.00	0.00	50.08	
			BETA	9.27	121.18	884.84	4345.39	8269.81	15531.05	99999.99	99999.99		
100.81	4.21	1.00	UP	31568.10	24746.31	15746.16	10018.84	6562.23	3432.85	499.83	237.99	49.69	98.45
102		1.00	DOWN	3380.08	204.93	17.03	2.71	1.07	0.51	0.02	0.00	50.13	
			BETA	9.34	120.75	924.61	3696.99	6132.93	6731.08	24991.50	99999.99		
101.81	4.23	1.00	UP	31465.30	24444.64	15411.02	9735.49	6344.64	3307.43	470.32	221.90	49.74	98.47
103		1.00	DOWN	3230.61	198.11	17.11	2.78	1.09	0.38	0.02	0.00	49.93	
			BETA	9.74	123.39	900.70	3501.97	5820.77	8703.76	23516.00	99999.99		
102.80	4.31	1.00	UP	31525.52	24537.47	15505.67	9812.07	6418.43	3342.28	490.63	229.74	49.83	98.55
104		1.00	DOWN	3178.44	196.88	17.96	3.15	1.07	0.26	0.02	0.00	49.98	
			BETA	9.92	124.63	863.34	3114.94	5998.53	12854.92	24531.50	99999.99		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
103.81	4.31	1.00	UP	31679.91	24725.41	15658.95	9915.01	6463.71	3376.89	489.38	230.04	50.11	98.59
105		1.00	DOWN	3041.12	189.23	17.95	3.11	1.09	0.32	0.04	0.02	50.07	
			BETA	10.42	130.66	872.36	3188.11	5930.01	10552.78	12234.50	11502.00		
104.81	4.34	1.00	UP	31794.36	25014.16	15950.95	10166.02	6664.20	3500.53	503.25	238.86	49.75	98.62
106		1.00	DOWN	2984.67	182.62	16.05	2.89	1.03	0.38	0.02	0.00	50.06	
			BETA	10.65	136.97	993.83	3517.65	6470.10	9211.92	25162.50	99999.99		
105.80	4.40	1.00	UP	31758.03	24848.04	15741.55	9972.31	6497.21	3384.14	487.48	228.88	49.70	98.68
107		1.00	DOWN	2920.55	188.70	16.97	2.93	1.01	0.24	0.00	0.00	50.08	
			BETA	10.87	131.68	927.61	3403.52	6432.88	14100.58	99999.99	99999.99		
106.80	4.44	1.00	UP	31830.15	25094.88	16018.43	10195.00	6682.29	3504.07	513.76	242.80	49.97	98.75
108		1.00	DOWN	2808.38	178.86	16.43	2.71	1.11	0.42	0.04	0.00	50.14	
			BETA	11.33	140.30	974.95	3761.99	6020.08	8343.02	12844.00	99999.99		
107.80	4.44	1.00	UP	31754.77	24764.35	15634.21	9885.11	6434.49	3368.65	498.47	236.60	49.94	98.81
109		1.00	DOWN	2722.50	178.52	16.16	3.36	1.35	0.48	0.04	0.00	50.08	
			BETA	11.66	138.72	967.46	2942.00	4766.29	7018.02	12461.75	99999.99		
108.79	4.40	1.00	UP	31823.60	24912.81	15774.66	9978.82	6514.62	3412.22	498.08	234.77	50.03	98.86
110		1.00	DOWN	2620.46	176.28	15.57	2.83	1.05	0.40	0.02	0.02	50.02	
			BETA	12.14	141.33	1013.14	3526.08	6204.40	8530.55	24904.00	11738.50		
109.80	4.53	1.00	UP	31586.73	24666.24	15624.63	9914.88	6476.05	3390.71	492.86	236.99	51.03	98.88
111		1.00	DOWN	2529.69	170.27	15.61	2.60	0.93	0.40	0.06	0.02	50.17	
			BETA	12.49	144.87	1000.94	3813.42	6963.49	8476.77	8214.33	11849.50		
110.79	4.48	1.00	UP	31430.64	24434.90	15428.52	9740.31	6329.28	3284.31	479.86	229.74	50.19	98.93
112		1.00	DOWN	2439.69	167.17	16.14	3.15	0.99	0.34	0.00	0.00	49.98	
			BETA	12.88	146.17	955.92	3092.16	6393.21	9659.74	99999.99	99999.99		
111.78	4.53	1.00	UP	31510.77	24702.89	15721.62	10005.09	6547.44	3420.73	503.20	236.29	49.68	99.00
113		1.00	DOWN	2383.35	162.16	15.28	2.65	0.93	0.38	0.06	0.02	49.97	
			BETA	13.22	152.34	1028.90	3775.51	7040.26	9001.92	8386.67	11814.50		
112.79	4.55	1.00	UP	31858.35	25304.78	16350.19	10486.56	6899.89	3625.36	527.60	247.77	50.78	99.04
114		1.00	DOWN	2381.77	167.73	15.55	2.88	1.05	0.40	0.02	0.02	49.98	
			BETA	13.38	150.87	1051.46	3641.17	6571.32	9063.40	26380.00	12388.50		
113.79	4.58	1.00	UP	31576.81	24750.34	15761.95	10053.18	6580.53	3449.80	508.35	240.62	49.95	99.07
115		1.00	DOWN	2245.19	158.36	15.46	2.65	1.29	0.26	0.04	0.00	49.96	
			BETA	14.06	156.29	1019.53	3793.65	5101.19	13268.46	12708.75	99999.99		
114.79	4.62	1.00	UP	31461.62	24289.33	15233.31	9591.29	6225.92	3236.07	471.76	221.11	50.62	99.09
116		1.00	DOWN	2238.10	160.14	14.49	2.59	1.05	0.32	0.02	0.02	50.08	
			BETA	14.06	151.68	1051.30	3703.20	5929.45	10112.72	23588.00	11055.50		
115.78	4.68	1.00	UP	31430.52	24156.56	15098.04	9494.84	6165.11	3196.91	471.73	224.44	48.57	99.11
117		1.00	DOWN	2176.10	154.66	14.55	2.55	0.79	0.26	0.06	0.02	49.97	
			BETA	14.44	156.19	1037.67	3723.47	7803.94	12295.81	7862.17	11222.00		
116.77	4.66	1.00	UP	31451.81	24454.09	15447.09	9779.50	6380.78	3326.83	488.82	233.54	50.26	99.12
118		1.00	DOWN	2109.80	148.68	13.85	2.70	1.03	0.38	0.02	0.00	49.97	
			BETA	14.91	164.47	1115.31	3622.04	6194.93	8754.82	24441.00	99999.99		
117.78	4.73	1.00	UP	31653.75	24881.22	15885.87	10129.02	6629.35	3467.92	499.47	236.52	49.34	99.16
119		1.00	DOWN	2148.76	154.52	14.81	2.97	1.23	0.65	0.02	0.00	49.95	
			BETA	14.73	161.02	1072.64	3410.44	5389.72	5335.26	24973.50	99999.99		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
118.77	4.73	1.00	UP	31536.12	24680.47	15687.07	9955.00	6506.40	3402.57	495.28	238.29	50.05	99.20
120		1.00	DOWN	1984.23	142.40	13.86	2.91	1.07	0.40	0.00	0.00	49.97	
			BETA	15.89	173.32	1131.82	3420.96	6080.75	8506.42	99999.99	99999.99		
119.78	4.77	1.00	UP	31586.84	24536.99	15444.48	9758.19	6343.15	3307.02	484.47	226.97	50.34	99.24
121		1.00	DOWN	1931.57	138.71	13.04	2.74	1.01	0.36	0.02	0.00	49.85	
			BETA	16.35	176.89	1184.39	3561.38	6280.35	9186.17	24223.50	99999.99		
120.77	4.79	1.00	UP	31614.42	24536.96	15425.02	9732.47	6335.06	3313.59	482.65	228.16	49.70	99.25
122		1.00	DOWN	1955.52	139.16	13.55	2.93	1.19	0.40	0.00	0.00	50.03	
			BETA	16.17	176.32	1138.38	3321.66	5323.58	8283.98	99999.99	99999.99		
121.77	4.79	1.00	UP	31645.51	24517.78	15386.31	9674.84	6284.59	3270.27	479.76	227.62	50.04	99.28
123		1.00	DOWN	1923.35	135.81	13.66	2.73	1.03	0.42	0.02	0.00	50.02	
			BETA	16.45	180.53	1126.38	3543.90	6101.54	7786.36	23988.00	99999.99		
122.76	4.84	1.00	UP	31657.61	24563.64	15422.35	9704.92	6320.73	3302.12	476.35	221.51	49.53	99.30
124		1.00	DOWN	1922.90	142.35	13.82	2.72	1.09	0.38	0.02	0.00	50.08	
			BETA	16.46	172.56	1115.94	3567.99	5798.83	8689.79	23817.50	99999.99		
123.77	4.87	1.00	UP	31761.34	24729.14	15592.21	9861.74	6442.05	3367.43	494.79	235.92	50.50	99.31
125		1.00	DOWN	1931.15	136.65	13.74	2.65	0.93	0.38	0.02	0.02	49.92	
			BETA	16.45	180.97	1134.80	3721.41	6926.94	8861.66	24739.50	11796.00		
124.76	4.91	1.00	UP	31508.39	24664.19	15685.72	9977.65	6523.48	3406.70	490.40	229.51	49.64	99.36
126		1.00	DOWN	1865.98	138.11	13.51	3.16	1.25	0.50	0.04	0.00	49.98	
			BETA	16.89	178.58	1161.05	3157.48	5218.78	6813.40	12260.00	99999.99		
125.76	4.89	1.00	UP	31463.81	24442.69	15405.99	9750.70	6353.50	3298.19	477.99	226.15	49.64	99.39
127		1.00	DOWN	1897.94	138.94	14.13	2.75	1.17	0.53	0.04	0.04	49.75	
			BETA	16.58	175.92	1090.30	3545.71	5430.34	6223.00	11949.75	5653.75		
126.75	4.93	1.00	UP	31529.48	24731.33	15749.23	10024.95	6553.85	3428.71	492.85	230.47	49.93	99.46
128		1.00	DOWN	1833.29	136.91	13.87	2.93	1.33	0.65	0.08	0.02	49.78	
			BETA	17.20	180.64	1135.49	3421.48	4927.71	5274.94	6160.62	11523.50		
127.76	4.94	1.00	UP	31535.78	24760.55	15805.09	10078.38	6604.34	3452.64	497.13	232.82	48.26	99.50
129		1.00	DOWN	1857.79	138.21	13.73	2.95	1.19	0.46	0.04	0.00	49.94	
			BETA	16.97	179.15	1151.14	3416.40	5549.87	7505.74	12428.25	99999.99		
128.75	4.95	1.00	UP	31382.07	24497.11	15506.98	9840.98	6425.00	3363.20	489.24	231.83	50.50	99.54
130		1.00	DOWN	1777.98	130.25	13.82	2.83	1.07	0.28	0.02	0.02	50.06	
			BETA	17.65	188.08	1122.07	3477.38	6004.67	12011.43	24462.00	11591.50		
129.76	5.00	1.00	UP	31524.54	24607.71	15590.22	9884.77	6452.20	3356.44	486.59	227.87	49.38	99.56
131		1.00	DOWN	1769.21	131.50	13.09	2.60	1.21	0.48	0.02	0.02	50.08	
			BETA	17.82	187.13	1191.00	3801.83	5332.40	6992.58	24329.50	11393.50		
130.75	5.01	1.00	UP	31513.69	24817.58	15896.24	10160.23	6662.27	3492.24	508.65	242.08	50.18	99.60
132		1.00	DOWN	1730.69	129.25	13.11	2.67	1.27	0.53	0.06	0.02	49.98	
			BETA	18.21	192.01	1212.53	3805.33	5245.88	6589.13	8477.50	12104.00		
131.75	5.01	1.00	UP	31267.85	24124.63	15102.35	9515.82	6176.63	3203.08	468.83	226.08	49.10	99.64
133		1.00	DOWN	1639.14	120.96	12.26	2.42	1.25	0.38	0.12	0.02	50.20	
			BETA	19.08	199.44	1231.84	3932.16	4941.30	8429.16	3906.92	11304.00		
132.74	5.04	1.00	UP	31387.49	24300.97	15299.85	9664.45	6293.18	3281.46	482.75	230.86	50.57	99.67
134		1.00	DOWN	1467.48	109.44	12.70	2.97	1.15	0.50	0.04	0.02	49.72	
			BETA	21.39	222.05	1204.71	3254.02	5472.33	6562.92	12068.75	11543.00		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
133.75	5.04	1.00	UP	31587.75	24776.53	15798.65	10066.17	6597.56	3458.64	513.74	244.71	49.87	99.71
135		1.00	DOWN	1484.64	110.70	12.12	2.81	1.09	0.28	0.00	0.00	49.99	
			BETA	21.28	223.82	1303.52	3582.27	6052.81	12352.29	99999.99	99999.99		
134.74	5.09	1.00	UP	31292.81	24488.39	15579.19	9909.82	6485.16	3393.53	503.93	239.91	50.71	99.73
136		1.00	DOWN	1501.06	112.50	11.58	3.11	1.41	0.73	0.04	0.00	50.08	
			BETA	20.85	217.67	1345.35	3186.44	4599.40	4648.67	12598.25	99999.99		
135.74	5.10	1.00	UP	31643.53	24720.29	15707.05	10015.47	6574.92	3460.97	501.51	237.23	49.58	99.76
137		1.00	DOWN	1504.53	109.50	12.67	2.87	1.25	0.44	0.00	0.00	49.98	
			BETA	21.03	225.76	1239.70	3489.71	5259.94	7865.84	99999.99	99999.99		
136.74	5.15	1.00	UP	31212.37	24304.31	15370.77	9760.08	6398.29	3357.69	495.06	235.34	48.54	99.77
138		1.00	DOWN	1478.55	103.58	10.07	2.50	0.95	0.28	0.02	0.02	49.97	
			BETA	21.11	234.64	1526.39	3904.03	6735.04	11991.75	24753.00	11767.00		
137.73	5.13	1.00	UP	31480.42	24566.75	15599.04	9922.64	6492.61	3399.35	499.17	237.68	49.15	99.77
139		1.00	DOWN	1449.25	107.16	11.84	3.23	1.43	0.46	0.04	0.02	50.06	
			BETA	21.72	229.25	1317.49	3072.02	4540.29	7389.89	12479.25	11884.00		
138.74	5.20	1.00	UP	31274.71	24565.31	15714.90	10053.56	6614.27	3467.00	506.49	237.51	49.33	99.79
140		1.00	DOWN	1451.06	105.37	12.16	2.74	1.13	0.44	0.04	0.00	49.89	
			BETA	21.55	233.13	1292.34	3669.18	5853.34	7879.55	12662.25	99999.99		
139.73	5.20	1.00	UP	31412.43	24792.36	15919.51	10199.89	6710.43	3530.58	528.67	249.74	50.66	99.80
141		1.00	DOWN	1382.09	101.70	10.77	2.79	1.39	0.53	0.04	0.00	49.98	
			BETA	22.73	243.78	1478.13	3655.87	4827.65	6661.47	13216.75	99999.99		
140.73	5.23	1.00	UP	31482.58	25030.39	16219.40	10456.55	6921.35	3662.13	528.16	247.71	49.59	99.79
142		1.00	DOWN	1427.64	104.18	12.46	3.16	1.43	0.56	0.06	0.04	50.06	
			BETA	22.05	240.26	1301.72	3309.03	4840.10	6539.52	8802.67	6192.75		
141.74	5.20	1.00	UP	31708.18	25287.37	16401.40	10567.84	6998.43	3705.50	550.76	258.14	50.78	99.82
143		1.00	DOWN	1469.05	107.64	12.48	3.37	1.47	0.67	0.06	0.02	50.17	
			BETA	21.58	234.93	1314.21	3135.86	4760.84	5530.60	9179.33	12907.00		
142.73	5.29	1.00	UP	31701.64	25119.84	16191.95	10430.52	6885.04	3626.54	524.73	242.82	48.53	99.83
144		1.00	DOWN	1476.56	106.80	12.07	3.52	1.46	0.55	0.06	0.00	50.20	
			BETA	21.47	235.20	1341.50	2963.22	4715.78	6593.71	8745.50	99999.99		
143.72	5.29	1.00	UP	31451.43	24715.04	15778.01	10048.56	6600.73	3471.49	505.91	242.16	50.57	99.84
145		1.00	DOWN	1483.21	108.51	11.95	2.87	1.07	0.34	0.04	0.00	49.98	
			BETA	21.20	227.77	1320.34	3501.24	6168.91	10210.26	12647.75	99999.99		
144.73	5.30	1.00	UP	31438.27	24589.83	15623.67	9945.82	6520.91	3420.83	500.79	239.10	50.32	99.86
146		1.00	DOWN	1369.56	98.71	11.49	2.58	1.19	0.59	0.06	0.02	49.87	
			BETA	22.96	249.11	1359.76	3854.97	5479.76	5798.02	8346.50	11955.00		
145.72	5.32	1.00	UP	31827.16	25197.65	16243.60	10431.19	6896.60	3639.52	536.77	255.90	49.83	99.89
147		1.00	DOWN	1418.76	104.56	11.80	3.09	1.69	0.73	0.02	0.00	50.08	
			BETA	22.43	240.99	1376.58	3375.79	4080.83	4985.64	26838.50	99999.99		
146.72	5.38	1.00	UP	31648.70	25176.98	16298.62	10510.17	6947.85	3664.52	535.56	252.79	49.86	99.92
148		1.00	DOWN	1400.78	99.45	11.51	3.21	1.43	0.73	0.06	0.04	49.86	
			BETA	22.59	253.16	1416.04	3274.20	4858.64	5019.89	8926.00	6319.75		
147.71	5.39	1.00	UP	31612.96	25121.08	16239.93	10439.86	6896.63	3636.76	533.77	250.20	49.90	99.94
149		1.00	DOWN	1403.61	103.33	12.73	3.19	1.39	0.65	0.04	0.02	50.25	
			BETA	22.52	243.12	1275.72	3272.68	4961.60	5595.02	13344.25	12510.00		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
148.72	5.35	1.00	UP	31822.90	25055.89	16042.44	10269.00	6752.69	3545.48	516.89	244.24	50.17	99.96
150		1.00	DOWN	1327.49	96.73	11.52	2.46	1.07	0.48	0.04	0.02	50.09	
			BETA	23.97	259.03	1392.57	4174.39	6310.93	7386.42	12922.25	12212.00		
149.71	5.41	1.00	UP	31634.98	24923.59	15946.64	10181.89	6679.47	3505.63	512.04	243.23	50.22	99.97
151		1.00	DOWN	1325.29	97.60	11.81	2.91	1.25	0.52	0.08	0.02	49.93	
			BETA	23.87	255.36	1350.27	3498.93	5343.58	6741.60	6400.50	12161.50		
150.72	5.40	1.00	UP	31696.55	25054.22	16089.91	10303.72	6774.89	3555.75	516.86	242.79	49.93	99.99
152		1.00	DOWN	1344.04	101.52	11.82	2.90	1.17	0.38	0.00	0.00	50.08	
			BETA	23.58	246.79	1361.24	3553.01	5790.50	9357.24	99999.99	99999.99		
151.71	5.41	1.00	UP	31864.28	25289.54	16327.49	10464.20	6888.11	3628.16	526.18	247.35	50.14	100.01
153		1.00	DOWN	1327.00	97.12	10.92	2.91	1.45	0.69	0.08	0.02	49.94	
			BETA	24.01	260.39	1495.19	3595.95	4750.42	5258.20	6577.25	12367.50		
152.71	5.45	1.00	UP	31672.99	25062.73	16101.25	10297.38	6777.53	3571.43	527.28	251.50	50.02	100.08
154		1.00	DOWN	1290.17	96.19	11.52	3.19	1.78	0.87	0.06	0.00	50.00	
			BETA	24.55	260.55	1397.68	3228.02	3807.60	4105.09	8788.00	99999.99		
153.70	5.54	1.00	UP	31884.96	25380.68	16447.79	10583.63	6981.82	3671.44	528.73	250.38	50.10	100.11
155		1.00	DOWN	1295.22	98.52	11.34	2.97	1.49	0.48	0.02	0.00	50.34	
			BETA	24.62	257.62	1450.42	3563.51	4685.79	7648.83	26436.50	99999.99		
154.71	5.48	1.00	UP	31928.00	25497.64	16544.19	10655.35	7048.93	3721.83	544.18	259.56	49.95	100.11
156		1.00	DOWN	1296.59	97.44	11.62	3.00	1.37	0.52	0.00	0.00	50.02	
			BETA	24.62	261.68	1423.77	3551.78	5145.20	7157.37	99999.99	99999.99		
155.70	5.55	1.00	UP	31934.27	25430.31	16482.07	10610.20	7006.47	3709.16	544.86	254.77	49.98	100.17
157		1.00	DOWN	1307.62	99.92	12.42	3.09	1.47	0.59	0.00	0.00	49.97	
			BETA	24.42	254.51	1327.06	3433.72	4766.31	6286.71	99999.99	99999.99		
156.70	5.54	1.00	UP	31903.40	25260.95	16242.02	10407.44	6859.27	3616.29	527.94	250.01	50.10	100.15
158		1.00	DOWN	1282.62	95.67	11.37	3.03	1.31	0.42	0.06	0.00	49.98	
			BETA	24.87	264.04	1428.50	3434.80	5236.08	8610.21	8799.00	99999.99		
157.70	5.59	1.00	UP	31824.63	25295.91	16345.93	10503.82	6914.08	3639.72	542.37	257.11	50.74	100.17
159		1.00	DOWN	1310.38	97.44	12.17	3.51	1.57	0.62	0.08	0.04	50.08	
			BETA	24.29	259.60	1343.13	2992.54	4403.87	5870.52	6779.62	6427.75		
158.70	5.64	1.00	UP	31662.66	25016.79	16098.28	10338.53	6808.23	3580.39	521.00	247.13	51.10	100.18
160		1.00	DOWN	1293.68	94.86	12.02	3.27	1.39	0.71	0.12	0.10	49.78	
			BETA	24.47	263.72	1339.29	3161.63	4898.01	5042.80	4341.67	2471.30		
159.69	5.59	1.00	UP	31773.03	25235.52	16312.84	10473.64	6909.52	3664.16	536.85	252.63	49.56	100.17
161		1.00	DOWN	1263.89	91.72	11.44	3.03	1.45	0.63	0.04	0.02	49.89	
			BETA	25.14	275.14	1425.95	3456.65	4765.19	5816.13	13421.25	12631.50		
160.70	5.62	1.00	UP	31948.83	25479.01	16488.84	10603.55	7016.32	3709.73	545.81	259.24	50.54	100.19
162		1.00	DOWN	1253.02	93.04	11.57	3.39	1.74	0.57	0.06	0.04	49.98	
			BETA	25.50	273.85	1425.14	3127.89	4032.37	6508.30	9096.83	6481.00		
161.70	5.67	1.00	UP	31856.59	25286.52	16316.19	10475.87	6913.26	3658.25	537.88	253.07	50.10	100.19
163		1.00	DOWN	1372.05	101.94	11.90	3.37	1.55	0.63	0.08	0.02	50.10	
			BETA	23.22	248.05	1371.11	3108.57	4460.17	5806.75	6723.50	12653.50		
162.69	5.69	1.00	UP	32030.21	25584.04	16598.68	10702.76	7080.01	3745.75	552.87	260.93	49.80	100.18
164		1.00	DOWN	1325.92	97.49	11.79	2.56	1.17	0.59	0.14	0.02	49.96	
			BETA	24.16	262.43	1407.86	4180.77	6051.29	6348.73	3949.07	13046.50		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
163.69	5.69	1.00	UP	31936.52	25422.24	16441.24	10572.85	6973.38	3688.54	536.24	255.55	50.06	100.20
165		1.00	DOWN	1295.01	94.97	12.31	3.37	1.61	0.77	0.06	0.02	50.03	
			BETA	24.66	267.69	1335.60	3137.34	4331.29	4790.31	8937.33	12777.50		
164.68	5.74	1.00	UP	31854.69	25463.11	16576.56	10718.09	7104.66	3759.89	548.02	258.11	49.64	100.19
166		1.00	DOWN	1289.95	93.93	11.57	3.43	1.71	0.83	0.08	0.00	49.98	
			BETA	24.69	271.09	1432.72	3124.81	4154.77	4529.99	6850.25	99999.99		
165.69	5.78	1.00	UP	31903.99	25613.57	16742.67	10865.71	7227.99	3834.42	562.39	270.71	50.03	100.23
167		1.00	DOWN	1316.65	97.18	11.47	3.15	1.39	0.65	0.00	0.00	49.96	
			BETA	24.23	263.57	1459.69	3449.43	5199.99	5899.11	99999.99	99999.99		
166.68	5.72	1.00	UP	31841.83	25496.85	16626.88	10759.08	7133.94	3774.06	545.94	259.72	49.96	100.24
168		1.00	DOWN	1314.38	97.34	12.90	3.27	1.35	0.55	0.04	0.02	49.99	
			BETA	24.23	261.94	1288.91	3290.24	5284.40	6861.93	13648.50	12986.00		
167.69	5.86	1.00	UP	31853.33	25416.50	16512.71	10657.24	7062.48	3727.77	540.25	257.04	49.71	100.25
169		1.00	DOWN	1287.09	94.97	12.18	3.21	1.47	0.63	0.06	0.06	49.89	
			BETA	24.75	267.63	1355.72	3320.01	4804.41	5917.10	9004.17	4284.00		
168.68	5.81	1.00	UP	31955.33	25519.13	16589.09	10722.46	7094.39	3743.58	546.73	258.95	50.32	100.30
170		1.00	DOWN	1262.54	94.04	11.83	3.26	1.66	0.71	0.04	0.04	50.00	
			BETA	25.31	271.36	1402.29	3289.10	4273.73	5272.65	13668.25	6473.75		
169.68	5.87	1.00	UP	31927.17	25486.51	16564.61	10693.51	7073.51	3746.83	557.79	263.08	50.43	100.30
171		1.00	DOWN	1245.32	95.15	11.98	3.41	1.71	0.71	0.10	0.04	50.29	
			BETA	25.64	267.86	1382.69	3135.93	4136.56	5277.23	5577.90	6577.00		
170.68	5.86	1.00	UP	32064.57	25867.87	17003.76	11052.24	7367.28	3931.01	580.77	273.47	49.94	100.37
172		1.00	DOWN	1239.12	94.58	12.55	3.67	1.68	0.75	0.10	0.04	50.01	
			BETA	25.88	273.50	1354.88	3011.51	4385.29	5241.35	5807.70	6836.75		
171.67	5.84	1.00	UP	32148.87	25831.08	16916.89	10973.47	7277.57	3856.41	558.92	261.22	49.91	100.37
173		1.00	DOWN	1227.97	91.33	12.27	3.75	1.94	0.71	0.02	0.02	50.01	
			BETA	26.18	282.83	1378.72	2926.26	3751.32	5431.56	27946.00	13061.00		
172.67	5.86	1.00	UP	32067.25	25778.48	16851.76	10917.16	7247.13	3856.32	573.12	270.34	50.93	100.40
174		1.00	DOWN	1214.43	93.60	12.62	3.69	1.71	0.65	0.04	0.04	50.05	
			BETA	26.41	275.41	1335.32	2958.58	4238.09	5932.80	14328.00	6758.50		
173.68	5.86	1.00	UP	32090.57	25791.16	16903.17	10983.30	7302.36	3877.83	571.42	267.76	51.00	100.41
175		1.00	DOWN	1209.18	92.37	12.94	3.74	1.70	0.71	0.08	0.02	49.65	
			BETA	26.54	279.22	1306.27	2936.71	4295.51	5461.73	7142.75	13388.00		
174.67	5.91	1.00	UP	32095.62	25817.62	16905.29	10959.06	7283.88	3866.57	571.16	269.70	50.02	100.41
176		1.00	DOWN	1199.52	93.71	12.24	3.31	1.51	0.54	0.02	0.02	49.86	
			BETA	26.76	275.51	1381.15	3310.89	4823.76	7160.31	28558.00	13485.00		
175.67	5.96	1.00	UP	32006.83	25752.20	16879.95	10958.00	7286.84	3877.34	575.83	273.41	49.94	100.41
177		1.00	DOWN	1227.81	97.65	12.58	3.59	1.69	0.50	0.02	0.00	49.97	
			BETA	26.07	263.72	1341.81	3052.37	4311.74	7754.68	28791.50	99999.99		
176.66	5.96	1.00	UP	32129.40	25756.81	16803.33	10866.30	7196.01	3809.53	565.75	270.83	50.38	100.41
178		1.00	DOWN	1229.48	95.21	12.40	3.31	1.66	0.71	0.18	0.04	49.97	
			BETA	26.13	270.53	1355.11	3282.87	4334.95	5365.54	3143.06	6770.75		
177.66	6.03	1.00	UP	32110.39	25703.72	16745.38	10832.08	7172.10	3795.29	560.43	265.64	49.92	100.44
179		1.00	DOWN	1195.96	92.20	12.17	3.61	1.59	0.63	0.04	0.02	50.11	
			BETA	26.85	278.78	1375.96	3000.58	4510.75	6024.27	14010.75	13282.00		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
178.66	5.96	1.00	UP	32047.71	25600.71	16638.10	10733.71	7109.22	3774.76	560.72	261.81	49.94	100.42
180		1.00	DOWN	1256.64	95.31	12.80	3.47	1.92	0.65	0.04	0.02	49.95	
			BETA	25.50	268.60	1299.85	3093.29	3702.72	5807.32	14018.00	13090.50		
179.65	6.05	1.00	UP	32100.65	25669.83	16702.11	10767.21	7110.09	3765.97	554.94	263.46	50.10	100.42
181		1.00	DOWN	1197.84	89.70	12.29	3.35	1.41	0.73	0.20	0.04	49.97	
			BETA	26.80	286.17	1359.00	3214.09	5042.62	5158.86	2774.70	6586.50		
180.66	6.08	1.00	UP	32076.69	25625.85	16620.52	10707.62	7084.55	3756.67	557.28	263.49	50.29	100.41
182		1.00	DOWN	1177.24	88.76	11.99	3.27	1.49	0.69	0.02	0.02	49.99	
			BETA	27.25	288.71	1386.20	3274.50	4754.73	5444.45	27864.00	13174.50		
181.65	6.07	1.00	UP	32054.04	25537.66	16522.93	10625.61	7025.85	3718.60	544.35	258.30	49.88	100.40
183		1.00	DOWN	1165.16	86.26	11.83	3.71	1.43	0.71	0.10	0.00	50.08	
			BETA	27.51	296.05	1396.70	2864.05	4913.18	5237.46	5443.50	99999.99		
182.66	6.12	1.00	UP	31908.47	25456.52	16540.21	10678.57	7082.38	3751.17	552.35	261.19	50.45	100.40
184		1.00	DOWN	1206.22	89.91	11.82	3.17	1.59	0.69	0.06	0.02	49.94	
			BETA	26.45	283.13	1399.34	3368.63	4454.33	5436.48	9205.83	13059.50		
183.65	6.14	1.00	UP	31698.87	25209.09	16290.16	10494.99	6928.25	3657.29	532.96	255.81	49.79	100.38
185		1.00	DOWN	1237.07	92.21	12.11	3.64	1.82	0.65	0.08	0.04	50.28	
			BETA	25.62	273.39	1345.18	2883.24	3806.73	5626.60	6662.00	6395.25		
184.65	6.20	1.00	UP	31801.22	25259.47	16325.48	10508.38	6938.79	3655.51	537.07	256.76	49.62	100.38
186		1.00	DOWN	1217.31	90.54	12.57	3.71	1.73	0.77	0.10	0.06	50.19	
			BETA	26.12	278.99	1298.77	2832.45	4010.86	4747.42	5370.70	4279.33		
185.65	6.15	1.00	UP	31929.75	25346.40	16355.79	10509.15	6925.29	3655.72	539.02	258.17	49.01	100.37
187		1.00	DOWN	1195.20	88.73	11.76	3.72	1.86	1.05	0.14	0.04	50.01	
			BETA	26.71	285.66	1390.80	2825.04	3723.27	3481.64	3850.14	6454.25		
186.64	6.17	1.00	UP	31784.03	25293.60	16323.46	10494.07	6933.88	3660.26	546.20	260.83	49.62	100.38
188		1.00	DOWN	1180.64	87.26	11.38	3.47	1.69	0.71	0.04	0.02	49.98	
			BETA	26.92	289.86	1434.40	3024.23	4102.89	5155.30	13655.00	13041.50		
187.65	6.21	1.00	UP	31945.95	25315.56	16332.75	10517.18	6953.04	3676.39	545.05	257.79	50.22	100.39
189		1.00	DOWN	1143.22	84.95	11.02	3.13	1.68	0.77	0.04	0.00	49.86	
			BETA	27.94	298.01	1482.10	3360.12	4138.71	4774.53	13626.25	99999.99		
188.64	6.21	1.00	UP	31684.02	25087.13	16123.93	10331.51	6796.77	3579.78	518.52	249.11	50.25	100.38
190		1.00	DOWN	1198.97	89.74	11.46	3.21	1.41	0.58	0.02	0.02	49.97	
			BETA	26.43	279.55	1406.97	3218.54	4820.40	6172.03	25926.00	12455.50		
189.65	6.19	1.00	UP	31945.94	25373.66	16371.31	10504.90	6936.09	3663.63	534.96	256.42	50.07	100.40
191		1.00	DOWN	1152.56	87.82	11.32	3.15	1.33	0.53	0.06	0.02	49.93	
			BETA	27.72	288.93	1446.23	3334.89	5215.11	6912.51	8916.00	12821.00		
190.64	6.21	1.00	UP	31868.44	25287.04	16300.20	10448.07	6882.58	3624.54	534.09	256.21	49.83	100.40
192		1.00	DOWN	1156.30	91.57	12.29	3.35	1.49	0.73	0.14	0.04	50.03	
			BETA	27.56	276.15	1326.30	3118.83	4619.18	4965.12	3814.93	6405.25		
191.64	6.27	1.00	UP	31802.52	25233.49	16280.08	10474.09	6909.42	3643.04	530.57	251.29	49.61	100.41
193		1.00	DOWN	1124.40	89.10	11.22	3.21	1.59	0.73	0.06	0.02	50.07	
			BETA	28.28	283.20	1450.99	3262.96	4345.55	4990.47	8842.83	12564.50		
192.63	6.25	1.00	UP	31762.91	25041.43	16067.28	10263.43	6748.52	3543.02	518.85	247.10	49.43	100.42
194		1.00	DOWN	1130.30	89.06	12.48	3.35	1.64	0.79	0.08	0.02	49.99	
			BETA	28.10	281.17	1287.44	3063.71	4114.95	4484.84	6485.62	12355.00		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
193.64	6.29	1.00	UP	31693.18	25134.19	16244.66	10446.96	6897.62	3647.77	538.45	256.35	49.81	100.44
195		1.00	DOWN	1104.22	86.01	11.40	3.41	1.49	0.61	0.06	0.02	50.04	
			BETA	28.70	292.22	1424.97	3063.62	4629.28	5979.95	8974.17	12817.50		
194.64	6.36	1.00	UP	31872.74	25355.04	16424.39	10589.66	6995.68	3701.18	545.90	259.45	49.97	100.43
196		1.00	DOWN	1091.21	84.24	12.71	3.96	1.86	0.91	0.10	0.02	50.06	
			BETA	29.21	300.99	1292.24	2674.16	3761.12	4067.23	5459.00	12972.50		
195.63	6.34	1.00	UP	31825.89	25274.90	16283.72	10456.02	6888.39	3617.27	528.24	252.84	50.01	100.44
197		1.00	DOWN	1110.73	85.24	11.70	3.37	1.50	0.53	0.04	0.02	49.46	
			BETA	28.65	296.51	1391.77	3102.68	4592.26	6825.04	13206.00	12642.00		
196.62	6.37	1.00	UP	31752.99	24985.15	15991.14	10202.25	6695.08	3518.73	509.98	242.06	51.10	100.45
198		1.00	DOWN	1097.48	85.83	12.04	3.59	1.94	0.91	0.10	0.04	50.24	
			BETA	28.93	291.10	1328.17	2841.85	3451.07	3866.74	5099.80	6051.50		
197.63	6.42	1.00	UP	31545.21	24550.58	15537.80	9849.07	6416.61	3349.73	486.89	229.81	49.54	100.42
199		1.00	DOWN	1095.28	84.31	11.53	3.05	1.66	0.79	0.08	0.00	50.36	
			BETA	28.80	291.19	1347.60	3229.20	3865.43	4240.16	6086.12	99999.99		
198.62	6.59	1.00	UP	31436.54	24112.32	15010.19	9432.18	6118.50	3170.28	466.86	224.62	50.18	100.43
200		1.00	DOWN	1766.96	135.30	15.94	3.53	1.33	0.59	0.12	0.08	50.00	
			BETA	17.79	178.21	941.67	2672.01	4600.38	5373.36	3890.50	2807.75		
199.63	6.59	1.00	UP	31510.76	24477.97	15420.93	9723.96	6318.45	3281.58	471.76	221.79	50.09	100.43
201		1.00	DOWN	1413.41	106.19	12.95	3.50	1.76	0.69	0.06	0.04	49.87	
			BETA	22.29	230.51	1190.81	2778.27	3590.03	4755.91	7862.67	5544.75		
200.62	6.63	1.00	UP	31781.37	24992.75	15946.94	10154.01	6640.21	3469.63	508.64	240.88	49.80	100.40
202		1.00	DOWN	1252.93	94.60	12.99	3.97	2.10	0.93	0.18	0.10	49.86	
			BETA	25.37	264.19	1227.63	2557.69	3162.00	3730.78	2825.78	2408.80		
201.62	6.65	1.00	UP	31770.29	25016.18	15996.25	10195.17	6665.89	3479.79	502.44	238.02	49.81	100.36
203		1.00	DOWN	1173.40	87.90	12.27	3.01	1.37	0.46	0.06	0.04	49.98	
			BETA	27.08	284.60	1303.69	3387.10	4865.61	7564.76	8374.00	5950.50		
202.63	6.73	1.00	UP	31828.31	24936.51	15817.53	10007.64	6527.26	3405.46	493.99	235.61	49.18	100.26
204		1.00	DOWN	1149.63	83.88	11.65	3.48	1.72	0.91	0.06	0.04	50.21	
			BETA	27.69	297.29	1357.73	2875.76	3794.92	3742.26	8233.17	5890.25		
203.62	6.71	1.00	UP	31646.86	24771.58	15729.35	9971.18	6514.26	3398.67	497.96	232.93	49.74	100.23
205		1.00	DOWN	1118.06	81.37	11.56	3.63	1.74	0.79	0.06	0.04	49.98	
			BETA	28.31	304.43	1360.67	2746.88	3743.83	4302.11	8299.33	5823.25		
204.61	6.72	1.00	UP	31730.76	24893.79	15873.49	10081.42	6581.58	3426.52	488.77	229.65	49.96	100.18
206		1.00	DOWN	1079.05	78.88	11.35	3.49	1.69	0.71	0.08	0.02	49.98	
			BETA	29.41	315.59	1398.55	2888.66	3894.43	4826.08	6109.62	11482.50		
205.62	6.78	1.00	UP	31804.54	25110.62	16084.00	10249.63	6718.46	3509.46	505.56	241.47	50.87	100.16
207		1.00	DOWN	1068.36	78.34	11.74	3.76	2.00	0.93	0.08	0.00	50.05	
			BETA	29.77	320.53	1370.02	2725.97	3359.23	3773.61	6319.50	99999.99		
206.61	6.80	1.00	UP	31919.88	25155.65	16076.27	10237.93	6694.19	3485.31	506.23	241.08	50.12	100.14
208		1.00	DOWN	1046.84	74.23	10.00	2.64	1.25	0.58	0.10	0.06	49.96	
			BETA	30.49	338.89	1607.63	3878.00	5355.35	6009.16	5062.30	4018.00		
207.61	6.80	1.00	UP	31979.21	25314.97	16244.77	10357.07	6781.01	3549.20	508.68	236.49	49.12	100.11
209		1.00	DOWN	1005.37	72.84	11.11	3.35	1.96	0.81	0.16	0.04	49.97	
			BETA	31.81	347.54	1462.18	3091.66	3459.70	4381.73	3179.25	5912.25		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
208.60	6.86	1.00	UP	31977.87	25396.15	16382.77	10483.43	6904.35	3641.92	529.39	251.25	50.29	100.08
210		1.00	DOWN	1007.83	75.89	12.43	4.05	2.02	0.91	0.10	0.02	50.08	
			BETA	31.73	334.64	1318.00	2588.50	3418.00	4002.11	5293.90	12562.50		
209.61	6.87	1.00	UP	32023.85	25344.92	16252.57	10375.43	6804.58	3573.53	524.46	247.24	50.01	100.06
211		1.00	DOWN	1004.92	75.10	11.86	3.60	1.43	0.67	0.08	0.04	50.00	
			BETA	31.87	337.48	1370.37	2882.06	4758.45	5333.63	6555.75	6181.00		
210.60	6.86	1.00	UP	32049.72	25430.06	16374.09	10476.39	6875.20	3601.47	518.15	244.42	49.85	100.03
212		1.00	DOWN	967.30	73.47	12.46	3.94	2.20	1.01	0.06	0.04	50.01	
			BETA	33.13	346.13	1314.13	2658.98	3125.09	3565.81	8635.83	6110.50		
211.60	6.92	1.00	UP	31967.19	25239.24	16128.35	10266.75	6726.40	3521.42	502.12	236.26	49.70	100.02
213		1.00	DOWN	980.21	75.15	10.80	3.37	1.70	0.65	0.02	0.02	49.99	
			BETA	32.61	335.85	1493.37	3046.51	3956.71	5417.57	25106.00	11813.00		
212.60	6.90	1.00	UP	31814.67	25183.33	16180.72	10332.79	6789.17	3549.51	504.00	237.11	49.28	99.99
214		1.00	DOWN	951.34	70.47	10.57	3.31	1.79	0.97	0.12	0.04	50.09	
			BETA	33.44	357.36	1530.82	3121.69	3792.83	3659.29	4200.00	5927.75		
213.60	6.91	1.00	UP	31818.21	25351.44	16451.66	10583.54	6964.00	3648.46	520.64	243.25	49.96	100.01
215		1.00	DOWN	938.88	72.26	11.41	3.72	1.98	0.91	0.20	0.06	49.90	
			BETA	33.89	350.84	1441.86	2845.04	3517.17	4009.30	2603.20	4054.17		
214.60	6.92	1.00	UP	31577.03	25098.51	16246.34	10447.82	6881.04	3614.36	519.42	247.92	49.40	99.99
216		1.00	DOWN	939.48	71.89	11.46	3.67	1.76	0.61	0.06	0.00	50.29	
			BETA	33.61	349.12	1417.66	2846.82	3909.68	5925.18	8657.00	99999.99		
215.59	6.91	1.00	UP	31639.91	25156.70	16277.85	10463.35	6887.10	3608.38	514.21	243.89	50.33	99.97
217		1.00	DOWN	924.51	72.86	11.12	3.63	1.84	0.79	0.08	0.04	50.08	
			BETA	34.22	345.27	1463.84	2882.47	3742.99	4567.57	6427.62	6097.25		
216.60	7.00	1.00	UP	31634.02	25171.98	16309.51	10487.53	6917.58	3631.61	525.96	251.64	49.80	99.96
218		1.00	DOWN	930.40	72.46	11.31	3.61	1.67	0.73	0.18	0.06	49.98	
			BETA	34.00	347.39	1442.04	2905.13	4142.26	4974.81	2922.00	4194.00		
217.59	7.01	1.00	UP	31618.14	25108.07	16211.43	10409.95	6846.59	3586.86	513.82	245.07	49.46	99.92
219		1.00	DOWN	967.81	74.45	11.23	3.25	1.57	0.69	0.10	0.02	49.85	
			BETA	32.67	337.25	1443.58	3203.06	4360.89	5198.35	5138.20	12253.50		
218.59	7.03	1.00	UP	31717.75	25298.83	16425.76	10583.47	6973.70	3654.99	529.94	249.11	49.86	99.88
220		1.00	DOWN	932.98	70.44	11.86	3.61	1.96	0.73	0.18	0.12	50.08	
			BETA	34.00	359.15	1384.97	2931.71	3558.01	5006.84	2944.11	2075.92		
219.58	7.08	1.00	UP	31791.91	25213.15	16255.47	10436.66	6861.89	3589.02	516.78	245.05	50.94	99.81
221		1.00	DOWN	939.28	73.48	12.00	4.36	2.24	0.85	0.06	0.02	49.99	
			BETA	33.85	343.13	1354.62	2393.73	3063.34	4222.38	8613.00	12252.50		
220.59	7.06	1.00	UP	31545.91	25042.75	16172.10	10367.20	6818.76	3579.01	511.32	237.99	50.73	99.76
222		1.00	DOWN	915.48	71.18	11.78	3.61	1.88	0.89	0.04	0.02	49.93	
			BETA	34.46	351.82	1372.84	2871.80	3627.00	4021.36	12783.00	11899.50		
221.58	7.07	1.00	UP	31850.92	25475.38	16576.11	10666.96	7021.44	3679.05	523.12	246.27	50.11	99.73
223		1.00	DOWN	947.63	74.13	12.35	3.96	1.84	0.73	0.04	0.02	49.85	
			BETA	33.61	343.66	1342.20	2693.68	3816.00	5039.79	13078.00	12313.50		
222.59	7.08	1.00	UP	31927.47	25672.39	16817.68	10922.09	7239.24	3815.57	549.78	255.48	49.41	99.67
224		1.00	DOWN	888.99	68.13	11.31	3.31	1.65	0.87	0.14	0.06	49.86	
			BETA	35.91	376.81	1486.97	3299.73	4387.42	4385.71	3927.00	4258.00		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
223.58	7.14	1.00	UP	31817.22	25444.91	16577.21	10718.34	7093.29	3729.81	545.05	260.74	50.65	99.61
225		1.00	DOWN	935.09	71.60	11.19	3.92	1.92	0.77	0.14	0.02	49.93	
			BETA	34.03	355.38	1481.43	2734.27	3694.42	4843.91	3893.21	13037.00		
224.58	7.17	1.00	UP	31700.38	25227.80	16328.62	10505.58	6927.00	3650.20	524.54	249.01	50.25	99.58
226		1.00	DOWN	954.36	74.17	12.00	4.16	2.16	1.07	0.16	0.08	49.97	
			BETA	33.22	340.13	1360.72	2525.38	3206.94	3411.40	3278.37	3112.62		
225.57	7.21	1.00	UP	31858.31	25578.12	16695.20	10796.98	7162.30	3772.70	534.53	251.95	49.66	99.55
227		1.00	DOWN	942.62	74.37	11.95	4.04	1.96	0.75	0.06	0.04	50.15	
			BETA	33.80	343.93	1397.09	2672.52	3654.23	5030.27	8908.83	6298.75		
226.58	7.20	1.00	UP	31858.94	25431.05	16483.78	10618.68	7010.20	3691.24	534.80	250.52	50.11	99.52
228		1.00	DOWN	907.48	72.26	11.72	4.20	2.30	1.07	0.08	0.02	49.91	
			BETA	35.11	351.94	1406.47	2528.26	3047.91	3449.76	6685.00	12526.00		
227.57	7.22	1.00	UP	31814.49	25360.56	16450.07	10577.82	6982.07	3654.71	524.71	249.12	50.02	99.50
229		1.00	DOWN	920.17	72.81	11.75	3.96	1.88	0.85	0.02	0.00	50.00	
			BETA	34.57	348.31	1400.01	2671.17	3713.87	4299.66	26235.50	99999.99		
228.57	7.23	1.00	UP	31937.18	25550.96	16621.27	10730.33	7090.35	3741.91	540.32	252.00	49.90	99.50
230		1.00	DOWN	933.78	74.68	12.67	4.42	2.12	0.83	0.14	0.12	49.77	
			BETA	34.20	342.14	1311.86	2427.68	3344.50	4508.33	3859.43	2100.00		
229.57	7.27	1.00	UP	31838.36	25217.75	16224.91	10359.55	6801.72	3566.82	518.40	249.02	49.94	99.50
231		1.00	DOWN	894.10	71.72	12.69	3.96	1.86	0.83	0.14	0.08	50.19	
			BETA	35.61	351.61	1278.56	2616.05	3656.84	4297.37	3702.86	3112.75		
230.57	7.28	1.00	UP	31835.13	25459.62	16585.28	10715.28	7087.77	3734.30	541.04	254.28	50.57	99.48
232		1.00	DOWN	886.96	72.88	12.41	3.90	2.14	1.05	0.22	0.12	50.09	
			BETA	35.89	349.34	1336.44	2747.51	3312.04	3556.48	2459.27	2119.00		
231.57	7.30	1.00	UP	31823.26	25593.19	16765.36	10868.77	7195.71	3794.08	548.06	259.85	48.86	99.50
233		1.00	DOWN	880.38	70.57	12.57	4.14	2.06	0.87	0.18	0.04	49.92	
			BETA	36.15	362.66	1333.76	2625.31	3493.06	4361.01	3044.78	6496.25		
232.56	7.33	1.00	UP	31877.40	25594.00	16735.67	10837.10	7176.18	3788.16	548.71	256.70	49.76	99.49
234		1.00	DOWN	894.43	75.57	12.89	4.24	2.18	1.07	0.02	0.02	50.17	
			BETA	35.64	338.68	1298.35	2555.92	3291.83	3540.34	27435.50	12835.00		
233.57	7.31	1.00	UP	31821.12	25604.16	16797.12	10900.94	7242.36	3826.03	554.41	260.75	50.16	99.49
235		1.00	DOWN	888.81	71.18	12.21	4.15	2.28	1.05	0.06	0.02	50.00	
			BETA	35.80	359.71	1375.69	2626.73	3176.47	3643.84	9240.17	13037.50		
234.56	7.35	1.00	UP	31814.40	25514.42	16664.48	10784.03	7147.47	3770.58	539.29	251.69	49.73	99.49
236		1.00	DOWN	885.89	72.58	11.18	3.94	1.98	0.73	0.12	0.04	50.13	
			BETA	35.91	351.54	1490.56	2737.06	3609.83	5165.18	4494.08	6292.25		
235.56	7.34	1.00	UP	31838.90	25583.47	16707.54	10818.17	7160.24	3780.04	548.43	257.19	50.02	99.48
237		1.00	DOWN	915.30	73.06	11.88	3.73	1.75	0.77	0.04	0.02	50.08	
			BETA	34.79	350.17	1406.36	2900.31	4091.57	4909.14	13710.75	12859.50		
236.55	7.40	1.00	UP	31908.30	25645.72	16779.93	10862.21	7196.44	3794.56	547.75	255.50	50.30	99.47
238		1.00	DOWN	922.16	76.37	13.24	4.84	2.42	1.13	0.12	0.04	49.98	
			BETA	34.60	335.81	1267.37	2244.26	2973.74	3358.02	4564.58	6387.50		
237.56	7.38	1.00	UP	32018.10	25724.53	16806.91	10876.75	7205.01	3805.22	556.74	262.17	50.19	99.45
239		1.00	DOWN	862.92	70.38	12.62	4.35	1.98	0.93	0.06	0.02	49.97	
			BETA	37.10	365.51	1331.77	2500.40	3638.89	4091.63	9279.00	13108.50		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
238.55	7.43	1.00	UP	31986.17	25659.43	16739.28	10823.37	7164.67	3783.05	551.03	259.89	50.23	99.42
240		1.00	DOWN	929.64	71.92	11.81	3.61	1.72	0.83	0.12	0.08	49.99	
			BETA	34.41	356.78	1417.38	2998.16	4165.51	4557.89	4591.92	3248.62		
239.56	7.46	1.00	UP	32039.44	25766.30	16830.79	10887.14	7219.36	3819.44	554.90	261.46	50.58	99.39
241		1.00	DOWN	943.51	72.58	11.98	3.92	1.84	0.87	0.14	0.10	50.32	
			BETA	33.96	355.01	1404.91	2777.33	3923.57	4390.16	3963.57	2614.60		
240.55	7.45	1.00	UP	31959.93	25439.48	16465.92	10571.78	6965.46	3663.45	534.67	252.31	49.83	99.34
242		1.00	DOWN	914.62	70.66	11.82	3.87	2.08	1.07	0.10	0.06	49.75	
			BETA	34.94	360.03	1393.06	2731.73	3348.78	3423.79	5346.70	4205.17		
241.55	7.50	1.00	UP	32133.13	25731.05	16754.31	10804.59	7133.20	3758.68	546.57	258.29	49.99	99.32
243		1.00	DOWN	978.36	74.76	13.15	4.36	2.40	0.89	0.14	0.06	50.09	
			BETA	32.84	344.18	1274.09	2478.12	2972.17	4223.24	3904.07	4304.83		
242.54	7.52	1.00	UP	32141.52	25858.56	16928.43	10963.77	7271.88	3861.40	559.81	263.00	50.40	99.29
244		1.00	DOWN	1028.61	76.52	12.78	4.47	2.32	1.21	0.06	0.00	49.79	
			BETA	31.25	337.93	1324.60	2452.74	3134.43	3191.24	9330.17	99999.99		
243.55	7.53	1.00	UP	32000.32	25549.47	16540.00	10637.88	7008.54	3694.40	547.44	259.69	49.97	99.26
245		1.00	DOWN	987.36	74.72	13.00	4.53	2.24	0.99	0.12	0.02	49.86	
			BETA	32.41	341.94	1272.31	2348.32	3128.81	3731.72	4562.00	12984.50		
244.54	7.57	1.00	UP	32051.29	25635.02	16662.21	10738.29	7092.25	3719.23	539.16	252.84	49.98	99.25
246		1.00	DOWN	981.36	73.04	12.46	4.62	2.48	1.05	0.10	0.06	49.97	
			BETA	32.66	350.97	1337.26	2324.31	2859.78	3542.12	5391.60	4214.00		
245.54	7.63	1.00	UP	32191.76	25905.69	16968.50	10978.12	7292.87	3850.84	564.26	262.17	50.29	99.23
247		1.00	DOWN	1030.94	78.12	13.42	4.95	2.56	1.13	0.14	0.10	49.82	
			BETA	31.23	331.61	1264.42	2217.80	2848.78	3407.82	4030.43	2621.70		
246.53	7.58	1.00	UP	32008.61	25676.26	16737.19	10813.27	7150.38	3778.13	544.80	259.11	50.14	99.22
248		1.00	DOWN	1003.25	73.24	12.45	4.18	2.20	0.83	0.16	0.06	50.17	
			BETA	31.90	350.58	1344.35	2586.91	3250.17	4551.96	3405.00	4318.50		
247.54	7.64	1.00	UP	32087.94	25603.46	16601.47	10674.11	7048.18	3723.16	548.94	262.32	50.10	99.20
249		1.00	DOWN	1042.31	75.30	12.62	4.10	1.90	0.85	0.08	0.04	49.97	
			BETA	30.79	340.02	1315.49	2603.44	3709.57	4380.19	6861.75	6558.00		
248.53	7.66	1.00	UP	32039.77	25657.61	16687.14	10756.72	7109.54	3746.01	547.40	261.85	49.74	99.22
250		1.00	DOWN	1013.61	74.04	12.14	4.36	2.18	0.85	0.14	0.06	49.98	
			BETA	31.61	346.54	1374.56	2467.14	3261.26	4407.07	3910.00	4364.17		
249.54	7.66	1.00	UP	32012.49	25563.41	16559.44	10651.90	7048.70	3730.01	547.74	261.77	49.80	99.25
251		1.00	DOWN	1032.02	77.05	12.54	4.30	2.18	0.91	0.06	0.02	49.97	
			BETA	31.02	331.78	1320.53	2477.19	3233.35	4098.91	9129.00	13088.50		
250.53	7.70	1.00	UP	32167.93	25699.73	16686.99	10745.03	7094.58	3736.47	544.73	255.09	50.06	99.25
252		1.00	DOWN	986.05	74.48	12.42	4.66	2.38	1.23	0.18	0.12	50.09	
			BETA	32.62	345.06	1343.56	2305.80	2980.92	3037.78	3026.28	2125.75		
251.53	7.69	1.00	UP	32279.56	26007.54	17050.93	11020.68	7303.85	3864.34	563.41	267.22	49.82	99.25
253		1.00	DOWN	1037.86	78.38	13.24	4.35	2.41	1.01	0.16	0.04	50.13	
			BETA	31.10	331.81	1287.83	2533.49	3030.64	3826.08	3521.31	6680.50		
252.53	7.73	1.00	UP	32223.90	25970.79	16997.69	11015.63	7299.34	3849.73	558.68	260.73	48.76	99.25
254		1.00	DOWN	1022.66	78.46	14.05	4.11	2.30	1.11	0.16	0.12	49.93	
			BETA	31.51	331.01	1209.80	2680.20	3173.63	3468.23	3491.75	2172.75		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
253.52	7.74	1.00	UP	32276.59	26103.18	17164.44	11143.00	7410.43	3937.46	580.34	272.46	50.15	99.27
255		1.00	DOWN	978.60	74.97	13.64	4.18	2.12	0.79	0.08	0.06	50.08	
			BETA	32.98	348.18	1258.39	2665.79	3495.49	4984.13	7254.25	4541.00		
254.53	7.76	1.00	UP	31998.86	25761.50	16860.02	10899.76	7218.63	3797.67	552.10	258.52	49.83	99.29
256		1.00	DOWN	972.13	72.84	12.06	3.90	2.00	0.79	0.06	0.06	50.68	
			BETA	32.92	353.67	1398.01	2794.81	3609.32	4807.18	9201.67	4308.67		
255.52	7.77	1.00	UP	31912.62	25577.01	16695.70	10784.72	7130.25	3740.77	539.86	250.65	50.10	99.29
257		1.00	DOWN	958.35	72.94	12.82	4.24	2.24	1.23	0.18	0.06	50.04	
			BETA	33.30	350.66	1302.32	2543.57	3183.15	3041.28	2999.22	4177.50		
256.52	7.80	1.00	UP	31799.53	25372.82	16429.42	10570.17	6950.85	3654.88	522.98	248.15	50.55	99.30
258		1.00	DOWN	954.43	73.71	13.34	4.51	2.08	0.93	0.06	0.04	49.70	
			BETA	33.32	344.22	1231.59	2343.72	3341.75	3929.98	8716.33	6203.75		
257.52	7.83	1.00	UP	31956.88	25790.63	16941.03	10978.52	7298.86	3865.66	559.80	267.18	50.66	99.29
259		1.00	DOWN	983.46	74.32	12.50	4.21	2.08	1.05	0.14	0.06	49.36	
			BETA	32.49	347.02	1355.28	2607.72	3509.07	3681.58	3998.57	4453.00		
258.52	7.57	1.00	UP	32040.70	25752.12	16812.62	10874.47	7190.19	3805.22	544.59	259.10	49.87	99.28
260		1.00	DOWN	888.72	68.49	12.62	4.24	2.32	1.01	0.06	0.02	49.89	
			BETA	36.05	376.00	1332.22	2564.73	3099.22	3767.54	9076.50	12955.00		
259.51	7.61	1.00	UP	32027.09	25739.44	16794.95	10853.00	7189.43	3785.07	557.06	266.16	49.04	99.26
261		1.00	DOWN	775.91	57.63	12.55	4.59	2.18	0.95	0.08	0.04	49.88	
			BETA	41.28	446.63	1338.24	2364.49	3297.90	3984.28	6963.25	6654.00		
260.52	7.66	1.00	UP	32050.35	25576.79	16586.89	10680.65	7033.57	3710.43	536.17	251.11	50.72	99.22
262		1.00	DOWN	774.54	54.46	11.56	4.34	2.36	1.17	0.14	0.06	50.15	
			BETA	41.38	469.64	1434.85	2460.98	2980.33	3171.31	3829.79	4185.17		
261.51	7.63	1.00	UP	31792.82	25229.35	16202.25	10357.88	6785.36	3551.85	513.24	240.25	49.97	99.18
263		1.00	DOWN	793.75	57.71	11.71	4.01	2.20	1.09	0.12	0.00	49.93	
			BETA	40.05	437.17	1383.63	2583.01	3084.25	3258.58	4277.00	99999.99		
262.51	7.62	1.00	UP	32060.23	25470.52	16434.47	10527.48	6931.21	3643.32	532.29	254.25	50.31	99.15
264		1.00	DOWN	835.21	58.22	11.59	4.22	2.12	0.83	0.18	0.08	49.80	
			BETA	38.39	437.49	1417.99	2494.66	3269.44	4389.54	2957.17	3178.12		
263.51	7.67	1.00	UP	31948.24	25240.28	16146.00	10291.07	6740.98	3529.97	514.34	243.68	49.81	99.11
265		1.00	DOWN	876.32	59.02	11.57	4.37	2.53	1.21	0.20	0.14	49.94	
			BETA	36.46	427.66	1395.51	2354.94	2664.42	2917.33	2571.70	1740.57		
264.50	7.66	1.00	UP	31912.15	25093.39	15952.42	10117.55	6620.39	3463.35	505.37	238.53	49.97	99.09
266		1.00	DOWN	899.85	61.21	11.33	4.19	2.30	0.85	0.06	0.02	50.04	
			BETA	35.46	409.96	1407.98	2414.69	2878.43	4074.53	8422.83	11926.50		
265.51	7.76	1.00	UP	31984.47	25235.06	16124.63	10263.93	6727.38	3513.39	509.40	244.60	49.94	99.07
267		1.00	DOWN	917.48	60.84	11.82	4.02	2.08	0.81	0.10	0.04	50.11	
			BETA	34.86	414.78	1364.18	2553.22	3234.32	4337.52	5094.00	6115.00		
266.50	7.71	1.00	UP	32025.48	25415.66	16355.65	10451.53	6862.59	3591.00	526.85	250.83	49.83	99.05
268		1.00	DOWN	1010.21	67.46	12.68	4.46	2.28	1.07	0.14	0.08	50.00	
			BETA	31.70	376.75	1289.88	2343.39	3009.91	3356.07	3763.21	3135.37		
267.50	7.70	1.00	UP	32087.12	25540.56	16475.37	10548.24	6938.19	3654.07	525.25	250.12	50.03	99.05
269		1.00	DOWN	976.08	64.30	12.77	4.34	2.53	1.17	0.20	0.06	49.97	
			BETA	32.87	397.21	1290.16	2430.47	2742.37	3123.14	2626.25	4168.67		

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ID:	FL12-1105	Test Date:	7/12/12		

Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
268.49	7.74	1.00	UP	31953.28	25209.18	16111.22	10246.45	6695.27	3509.38	510.33	243.32	50.16	99.03
270		1.00	DOWN	961.48	62.65	11.63	4.42	2.12	0.91	0.08	0.04	49.87	
			BETA	33.23	402.38	1385.32	2318.20	3158.15	3856.46	6379.12	6083.00		
269.50	7.80	1.00	UP	32085.17	25429.21	16311.18	10418.86	6840.34	3596.37	526.52	249.55	49.86	99.00
271		1.00	DOWN	1072.32	69.61	11.72	3.50	1.90	0.81	0.04	0.02	50.02	
			BETA	29.92	365.31	1391.74	2976.82	3600.18	4439.96	13163.00	12477.50		
270.49	7.83	1.00	UP	31955.99	25581.80	16626.09	10709.64	7085.26	3742.95	549.72	256.89	49.53	99.01
272		1.00	DOWN	1000.47	66.38	13.57	4.86	2.62	1.45	0.22	0.06	49.98	
			BETA	31.94	385.38	1225.21	2203.63	2704.30	2581.34	2498.73	4281.50		
271.50	7.83	1.00	UP	31924.19	25511.58	16560.56	10680.18	7045.49	3705.19	535.33	252.90	49.84	99.01
273		1.00	DOWN	1025.36	67.92	12.60	3.86	2.40	1.03	0.06	0.04	50.08	
			BETA	31.13	375.61	1314.33	2766.89	2935.62	3597.27	8922.17	6322.50		
272.49	7.85	1.00	UP	31734.63	25210.25	16269.59	10447.18	6879.47	3590.46	516.12	245.97	50.04	99.00
274		1.00	DOWN	1019.61	66.58	12.17	3.93	1.82	0.81	0.12	0.04	49.95	
			BETA	31.12	378.65	1336.86	2658.32	3779.93	4432.67	4301.00	6149.25		
273.49	7.83	1.00	UP	31797.48	25314.84	16367.68	10523.68	6935.22	3638.71	521.61	243.96	49.93	98.99
275		1.00	DOWN	1031.78	67.89	12.68	4.41	2.29	1.11	0.16	0.08	50.10	
			BETA	30.82	372.88	1290.83	2386.32	3028.48	3278.12	3260.06	3049.50		
274.48	7.87	1.00	UP	31924.37	25493.35	16544.07	10652.82	7019.88	3706.51	538.97	252.14	49.67	99.01
276		1.00	DOWN	1014.45	69.53	12.86	4.33	2.04	0.69	0.04	0.02	49.97	
			BETA	31.47	366.65	1286.48	2460.24	3441.12	5371.75	13474.25	12607.00		
275.49	7.91	1.00	UP	32091.73	25814.63	16876.38	10937.69	7252.90	3831.59	553.96	259.14	49.97	99.02
277		1.00	DOWN	1014.35	71.36	13.96	5.23	2.77	1.17	0.10	0.02	49.97	
			BETA	31.64	361.75	1208.91	2091.34	2618.38	3274.86	5539.60	12957.00		
276.49	7.87	1.00	UP	31872.97	25413.32	16445.58	10557.61	6959.27	3650.05	534.62	254.44	50.02	99.04
278		1.00	DOWN	1052.87	70.30	12.64	4.40	2.46	1.11	0.10	0.00	49.99	
			BETA	30.27	361.50	1301.07	2399.46	2828.97	3288.33	5346.20	99999.99		
277.48	7.95	1.00	UP	31889.79	25287.21	16272.19	10403.08	6837.47	3593.09	515.05	245.68	50.42	99.04
279		1.00	DOWN	1097.40	73.84	13.07	4.62	2.44	1.03	0.12	0.04	49.91	
			BETA	29.06	342.46	1245.00	2251.75	2802.24	3488.44	4292.08	6142.00		
278.48	7.91	1.00	UP	32003.39	25432.71	16374.94	10474.95	6884.96	3616.96	523.48	249.59	49.78	99.03
280		1.00	DOWN	1035.62	70.46	13.37	5.00	2.51	1.15	0.14	0.06	49.99	
			BETA	30.90	360.95	1224.75	2094.99	2743.01	3145.18	3739.14	4159.83		
279.48	7.97	1.00	UP	31925.51	25297.12	16245.06	10390.14	6822.23	3560.00	511.38	241.60	49.83	99.03
281		1.00	DOWN	1091.80	74.60	13.16	4.44	2.36	1.11	0.16	0.08	49.93	
			BETA	29.24	339.10	1234.43	2340.12	2890.78	3207.21	3196.12	3020.00		
280.47	8.01	1.00	UP	31870.57	25355.83	16362.13	10505.81	6911.45	3639.42	522.87	247.97	50.00	98.99
282		1.00	DOWN	1072.50	69.18	12.84	4.10	2.28	0.91	0.08	0.04	49.71	
			BETA	29.72	366.52	1274.31	2562.39	3031.34	3999.36	6535.87	6199.25		
281.47	7.96	1.00	UP	31843.09	25374.74	16436.59	10566.02	6954.38	3646.60	528.02	248.77	50.11	98.98
283		1.00	DOWN	1119.67	73.26	13.27	4.22	2.22	1.05	0.16	0.06	49.88	
			BETA	28.44	346.37	1238.63	2503.80	3132.60	3472.95	3300.12	4146.17		
282.47	7.98	1.00	UP	31761.79	25388.20	16490.60	10636.78	7021.36	3687.54	531.24	254.11	49.40	98.96
284		1.00	DOWN	1092.68	71.65	13.89	5.06	2.59	1.23	0.14	0.04	49.93	
			BETA	29.07	354.34	1187.23	2102.13	2710.95	2998.00	3794.57	6352.75		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
283.47	8.07	1.00	UP	31574.21	24796.49	15810.55	10071.02	6603.49	3439.90	485.37	230.04	50.37	98.89
285		1.00	DOWN	1143.85	73.59	12.99	4.84	2.54	1.15	0.12	0.02	50.00	
			BETA	27.60	336.95	1217.13	2080.79	2599.80	2991.22	4044.75	11502.00		
284.46	8.06	1.00	UP	31780.42	24961.82	15909.55	10091.25	6584.65	3443.91	507.89	235.79	49.29	98.87
286		1.00	DOWN	1051.14	62.08	12.44	4.49	2.45	0.93	0.12	0.04	49.85	
			BETA	30.23	402.09	1278.90	2247.49	2687.61	3703.13	4232.42	5894.75		
285.47	8.06	1.00	UP	31951.74	25334.09	16299.54	10408.62	6835.91	3574.88	515.10	247.19	49.89	98.87
287		1.00	DOWN	1109.02	62.60	11.99	4.31	2.54	1.01	0.10	0.06	49.94	
			BETA	28.81	404.70	1359.43	2414.99	2691.30	3539.49	5151.00	4119.83		
286.46	8.12	1.00	UP	32019.60	25495.30	16442.40	10546.21	6926.72	3635.85	525.85	247.59	50.14	98.85
288		1.00	DOWN	1160.65	68.48	12.09	4.14	2.06	1.05	0.18	0.12	50.09	
			BETA	27.59	372.30	1360.00	2547.39	3362.49	3462.71	2921.39	2063.25		
287.46	8.17	1.00	UP	32037.71	25368.02	16263.21	10356.59	6765.76	3540.67	524.03	249.38	50.01	98.85
289		1.00	DOWN	1138.72	66.80	13.20	4.61	2.28	1.07	0.18	0.08	50.09	
			BETA	28.13	379.76	1232.06	2246.55	2967.44	3309.04	2911.28	3117.25		
288.45	8.16	1.00	UP	32081.79	25346.46	16213.88	10300.88	6729.03	3519.32	511.70	241.26	49.85	98.85
290		1.00	DOWN	1088.78	62.11	11.87	4.43	2.35	0.95	0.12	0.08	49.65	
			BETA	29.47	408.09	1365.95	2325.26	2863.42	3704.55	4264.17	3015.75		
289.46	8.16	1.00	UP	32168.56	25638.11	16567.67	10610.41	6972.60	3647.31	532.60	251.36	49.70	98.84
291		1.00	DOWN	1085.56	64.38	12.25	4.34	2.30	1.07	0.20	0.16	49.67	
			BETA	29.63	398.23	1352.46	2444.79	3031.57	3408.70	2663.00	1571.00		
290.46	8.15	1.00	UP	32088.02	25496.37	16417.67	10502.93	6908.68	3630.19	529.50	246.76	49.75	98.85
292		1.00	DOWN	1107.45	65.69	12.34	4.48	2.10	0.97	0.14	0.10	49.62	
			BETA	28.97	388.13	1330.44	2344.40	3289.85	3742.46	3782.14	2467.60		
291.45	8.25	1.00	UP	32115.57	25464.81	16332.11	10408.10	6810.87	3572.81	523.41	247.06	49.68	98.83
293		1.00	DOWN	1103.97	67.25	12.35	4.66	2.62	1.29	0.08	0.08	49.92	
			BETA	29.09	378.66	1322.44	2233.50	2599.57	2769.62	6542.62	3088.25		
292.45	8.21	1.00	UP	32103.13	25527.31	16427.86	10494.30	6889.40	3604.92	528.32	250.28	49.99	98.82
294		1.00	DOWN	1040.22	61.11	12.37	4.48	2.00	1.07	0.10	0.06	49.32	
			BETA	30.86	417.73	1328.04	2342.48	3444.70	3369.08	5283.20	4171.33		
293.44	8.19	1.00	UP	32159.49	25609.40	16513.20	10547.30	6935.04	3658.74	531.36	250.01	49.92	98.83
295		1.00	DOWN	1034.82	59.52	12.05	4.32	2.28	1.09	0.20	0.08	49.96	
			BETA	31.08	430.27	1370.39	2441.50	3041.68	3356.64	2656.80	3125.12		
294.45	8.25	1.00	UP	32252.31	25864.54	16802.09	10813.40	7137.01	3770.08	553.73	260.17	50.38	98.83
296		1.00	DOWN	1059.19	64.90	12.83	4.95	2.69	1.05	0.14	0.06	50.54	
			BETA	30.45	398.53	1309.59	2184.53	2653.16	3590.55	3955.21	4336.17		
295.44	8.28	1.00	UP	32264.91	25963.53	16950.37	10944.18	7234.54	3808.38	555.49	266.44	50.22	98.83
297		1.00	DOWN	1012.55	62.00	12.78	4.92	2.40	0.83	0.12	0.06	49.98	
			BETA	31.87	418.77	1326.32	2224.43	3014.39	4588.41	4629.08	4440.67		
296.45	8.27	1.00	UP	32123.73	25590.20	16505.84	10548.35	6908.03	3624.90	526.78	246.35	50.03	98.86
298		1.00	DOWN	1043.30	64.70	13.43	4.99	2.54	0.85	0.16	0.08	50.06	
			BETA	30.79	395.52	1229.03	2113.90	2719.70	4264.59	3292.37	3079.37		
297.44	8.28	1.00	UP	32182.87	25623.16	16519.56	10559.40	6937.93	3639.58	526.49	248.14	49.90	98.87
299		1.00	DOWN	991.98	63.35	13.14	4.83	2.71	1.25	0.18	0.08	50.81	
			BETA	32.44	404.47	1257.20	2186.21	2560.12	2911.66	2924.94	3101.75		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
298.44	8.22	1.00	UP	32229.54	25837.13	16783.49	10778.40	7107.76	3742.63	541.79	255.76	49.85	98.86
300		1.00	DOWN	974.33	60.43	12.35	4.64	2.72	1.17	0.18	0.08	50.12	
			BETA	33.08	427.55	1358.99	2322.93	2613.15	3198.83	3009.94	3197.00		
299.43	8.28	1.00	UP	32177.62	25628.65	16527.42	10561.08	6934.59	3642.90	531.60	254.01	49.90	98.84
301		1.00	DOWN	997.27	61.14	12.94	4.56	2.75	1.25	0.12	0.04	49.80	
			BETA	32.27	419.18	1277.23	2316.03	2521.67	2914.32	4430.00	6350.25		
300.44	8.31	1.00	UP	32259.18	25664.54	16521.34	10524.24	6898.84	3619.62	528.85	248.99	50.06	98.86
302		1.00	DOWN	1001.24	60.54	12.00	4.38	2.42	1.01	0.20	0.10	49.76	
			BETA	32.22	423.93	1376.78	2402.79	2850.76	3583.78	2644.25	2489.90		
301.43	8.36	1.00	UP	32317.66	26031.36	17018.25	10982.58	7278.44	3843.49	562.67	267.67	49.39	98.85
303		1.00	DOWN	987.57	60.82	12.44	4.83	2.62	1.09	0.10	0.02	49.76	
			BETA	32.72	428.01	1368.03	2273.83	2778.03	3526.14	5626.70	13383.50		
302.43	8.37	1.00	UP	32494.43	26293.73	17276.79	11199.47	7434.87	3936.88	576.26	272.73	50.22	98.83
304		1.00	DOWN	1020.53	65.60	14.43	5.04	2.40	0.85	0.10	0.02	50.05	
			BETA	31.84	400.82	1197.28	2222.12	3097.86	4631.62	5762.60	13636.50		
303.43	8.46	1.00	UP	32419.43	26181.09	17202.05	11126.03	7387.87	3905.63	570.60	264.05	49.71	98.84
305		1.00	DOWN	1161.82	74.27	14.26	5.13	2.79	1.11	0.12	0.04	49.86	
			BETA	27.90	352.51	1206.31	2168.82	2647.98	3518.59	4755.00	6601.25		
304.42	8.51	1.00	UP	32393.23	26154.88	17105.34	11042.37	7293.61	3855.54	558.81	265.79	49.72	98.81
306		1.00	DOWN	1136.69	70.40	13.58	5.02	2.70	1.15	0.12	0.08	49.94	
			BETA	28.50	371.52	1259.60	2199.68	2701.34	3352.64	4656.75	3322.37		
305.43	8.54	1.00	UP	32372.68	25862.40	16727.63	10705.67	7046.42	3707.67	536.47	253.08	50.61	98.79
307		1.00	DOWN	1140.57	68.14	12.80	4.62	2.48	1.05	0.08	0.06	49.98	
			BETA	28.38	379.55	1306.85	2317.24	2841.30	3531.11	6705.87	4218.00		
306.42	8.54	1.00	UP	31970.59	25491.53	16484.73	10581.09	6958.87	3647.40	528.42	251.56	49.96	98.76
308		1.00	DOWN	1170.60	65.56	12.70	4.82	2.48	1.27	0.30	0.12	50.49	
			BETA	27.31	388.83	1298.01	2195.25	2806.00	2871.97	1761.40	2096.33		
307.42	8.54	1.00	UP	31949.10	25609.45	16653.00	10721.16	7077.86	3730.30	542.07	257.93	50.29	98.76
309		1.00	DOWN	1140.44	67.57	11.99	4.08	2.22	0.87	0.10	0.02	50.24	
			BETA	28.01	379.01	1388.91	2627.74	3188.23	4287.70	5420.70	12896.50		
308.41	8.53	1.00	UP	31946.99	25731.12	16811.42	10885.93	7217.74	3808.20	558.87	262.87	50.41	98.74
310		1.00	DOWN	1160.54	66.38	13.60	5.21	2.87	1.35	0.10	0.04	50.08	
			BETA	27.53	387.63	1236.13	2089.43	2514.89	2820.89	5588.70	6571.75		
309.42	8.59	1.00	UP	31961.11	25539.93	16579.28	10680.50	7060.78	3710.59	537.41	255.41	50.12	98.73
311		1.00	DOWN	1192.42	67.16	12.82	4.26	2.24	1.17	0.26	0.06	50.08	
			BETA	26.80	380.28	1293.24	2507.16	3152.13	3171.44	2066.96	4256.83		
310.41	8.58	1.00	UP	31967.87	25395.76	16331.64	10453.35	6868.46	3581.22	516.47	247.15	50.12	98.69
312		1.00	DOWN	1149.48	65.41	13.06	4.58	2.42	1.21	0.20	0.08	50.19	
			BETA	27.81	388.26	1250.51	2282.39	2838.21	2959.69	2582.35	3089.37		
311.42	8.65	1.00	UP	32079.16	25481.85	16395.25	10460.95	6853.94	3603.58	523.79	246.26	50.09	98.73
313		1.00	DOWN	1198.69	67.48	13.17	4.48	2.46	0.95	0.06	0.04	50.10	
			BETA	26.76	377.62	1244.89	2335.03	2786.15	3793.24	8729.83	6156.50		
312.41	8.65	1.00	UP	32157.17	25868.17	16893.12	10896.42	7201.65	3791.10	546.95	256.58	49.96	98.73
314		1.00	DOWN	1156.15	68.36	14.37	5.07	2.97	1.31	0.16	0.02	49.94	
			BETA	27.81	378.41	1175.58	2149.20	2424.80	2893.97	3418.44	12829.00		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
313.40	8.69	1.00	UP	32199.96	25955.89	16977.87	10984.15	7269.20	3839.36	557.57	264.16	50.14	98.71
315		1.00	DOWN	1190.41	69.94	13.52	4.73	2.61	1.03	0.16	0.08	49.98	
			BETA	27.05	371.12	1255.76	2322.23	2785.13	3727.53	3484.81	3302.00		
314.41	8.68	1.00	UP	32135.75	25838.02	16878.75	10911.90	7216.81	3803.74	558.31	262.23	49.91	98.72
316		1.00	DOWN	1141.03	67.61	13.45	4.97	2.93	1.37	0.32	0.18	50.18	
			BETA	28.16	382.16	1254.93	2195.55	2463.08	2776.45	1744.72	1456.83		
315.40	8.71	1.00	UP	32077.78	25683.77	16667.96	10714.59	7060.42	3708.74	529.86	248.28	49.92	98.74
317		1.00	DOWN	1085.12	61.42	12.12	4.44	2.50	1.17	0.14	0.06	49.77	
			BETA	29.56	418.17	1375.24	2413.20	2824.17	3169.86	3784.71	4138.00		
316.41	8.72	1.00	UP	32128.85	25884.00	16906.45	10926.51	7220.14	3810.27	563.28	267.02	50.17	98.74
318		1.00	DOWN	1113.94	66.85	13.74	5.19	2.93	1.23	0.10	0.08	49.92	
			BETA	28.84	387.20	1230.45	2105.30	2464.21	3097.78	5632.80	3337.75		
317.40	8.76	1.00	UP	32179.99	25866.06	16880.42	10902.28	7197.65	3791.14	559.72	266.08	49.97	98.80
319		1.00	DOWN	1062.27	65.58	13.98	5.33	2.72	1.17	0.24	0.06	50.43	
			BETA	30.29	394.42	1207.47	2045.46	2646.19	3240.29	2332.17	4434.67		
318.40	8.73	1.00	UP	32156.67	25969.39	17045.10	11061.23	7329.24	3873.99	564.87	266.37	50.02	98.78
320		1.00	DOWN	1060.09	63.14	13.31	4.64	2.64	1.03	0.08	0.02	50.00	
			BETA	30.33	411.30	1280.62	2383.89	2776.23	3761.16	7060.87	13318.50		
319.40	8.84	1.00	UP	32127.66	25947.65	17008.58	11026.66	7315.86	3882.75	561.19	260.47	50.37	98.79
321		1.00	DOWN	1085.13	69.15	13.99	5.39	2.89	1.29	0.12	0.04	49.86	
			BETA	29.61	375.24	1215.77	2045.76	2531.44	3009.88	4676.58	6511.75		
320.40	8.79	1.00	UP	32206.05	25935.81	16959.71	10956.85	7261.21	3834.57	554.30	259.48	50.15	98.82
322		1.00	DOWN	1061.76	67.31	13.82	5.07	2.91	1.35	0.06	0.04	50.08	
			BETA	30.33	385.32	1227.19	2161.11	2495.26	2840.42	9238.33	6487.00		
321.39	8.79	1.00	UP	32099.22	25801.49	16826.48	10860.19	7185.91	3788.94	558.41	261.49	50.00	98.84
323		1.00	DOWN	1113.33	70.77	13.46	4.94	2.70	1.13	0.02	0.00	49.97	
			BETA	28.83	364.58	1250.11	2198.42	2661.45	3353.04	27920.50	99999.99		
322.39	8.84	1.00	UP	32146.37	25859.84	16895.04	10893.80	7201.01	3793.37	555.57	264.41	48.52	98.84
324		1.00	DOWN	1157.30	71.85	14.54	5.45	2.89	1.31	0.20	0.06	49.97	
			BETA	27.78	359.91	1161.97	1998.86	2491.70	2895.70	2777.85	4406.83		
323.40	8.88	1.00	UP	32240.22	25984.86	17013.04	11018.98	7299.05	3845.19	563.40	266.70	49.94	98.84
325		1.00	DOWN	1121.37	69.77	14.02	5.01	2.59	1.11	0.14	0.08	50.03	
			BETA	28.75	372.44	1213.48	2199.40	2818.17	3464.14	4024.29	3333.75		
324.39	8.91	1.00	UP	32274.45	26182.19	17257.54	11201.28	7457.85	3953.33	570.88	272.38	49.90	98.85
326		1.00	DOWN	1124.58	70.36	14.74	5.09	2.81	1.21	0.12	0.04	50.13	
			BETA	28.70	372.12	1170.80	2200.64	2654.04	3267.21	4757.33	6809.50		
325.38	9.00	1.00	UP	32226.06	26102.01	17185.00	11174.13	7426.95	3936.03	579.57	272.57	50.14	98.83
327		1.00	DOWN	1132.87	69.16	14.17	4.95	2.65	0.93	0.10	0.06	50.32	
			BETA	28.45	377.41	1212.77	2257.40	2802.62	4232.29	5795.70	4542.83		
326.38	8.98	1.00	UP	32200.66	25933.63	16955.11	10960.07	7259.02	3827.90	561.97	265.94	49.72	98.82
328		1.00	DOWN	1114.29	68.98	13.30	4.70	2.44	1.07	0.18	0.10	50.00	
			BETA	28.90	375.96	1274.82	2331.93	2975.01	3577.48	3122.06	2659.40		
327.38	9.02	1.00	UP	32341.27	26187.36	17229.85	11187.58	7426.59	3931.82	569.10	270.64	50.16	98.80
329		1.00	DOWN	1133.46	68.50	13.63	4.83	2.58	1.17	0.16	0.06	49.89	
			BETA	28.53	382.30	1264.11	2316.27	2878.52	3360.53	3556.87	4510.67		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
328.38	9.03	1.00	UP	32174.96	26007.95	17078.43	11080.05	7356.63	3885.17	574.92	274.02	50.13	98.80
330		1.00	DOWN	1138.14	68.77	13.81	5.03	2.75	1.13	0.22	0.10	50.22	
			BETA	28.27	378.19	1236.67	2202.79	2675.14	3438.20	2613.27	2740.20		
329.37	9.04	1.00	UP	32118.35	25730.66	16693.08	10749.99	7092.40	3734.43	536.09	251.40	49.91	98.79
331		1.00	DOWN	1160.41	67.38	13.67	4.77	2.69	1.15	0.12	0.08	49.87	
			BETA	27.68	381.87	1221.15	2253.67	2636.58	3247.33	4467.42	3142.50		
330.38	9.04	1.00	UP	32334.70	26132.31	17137.48	11107.72	7371.43	3904.84	573.35	271.81	50.76	98.74
332		1.00	DOWN	1189.90	71.46	14.52	5.47	2.71	1.19	0.14	0.08	50.20	
			BETA	27.17	365.69	1180.27	2030.66	2720.08	3281.38	4095.36	3397.62		
331.37	9.05	1.00	UP	32272.31	26028.63	17035.61	10994.43	7274.23	3841.31	558.21	264.77	50.36	98.77
333		1.00	DOWN	1137.71	65.85	14.07	5.61	2.76	1.25	0.06	0.02	49.97	
			BETA	28.37	395.27	1210.78	1959.79	2635.59	3073.05	9303.50	13238.50		
332.37	9.08	1.00	UP	32367.06	26110.68	17106.24	11083.09	7345.89	3900.59	581.76	277.02	49.00	98.78
334		1.00	DOWN	1183.53	67.79	13.69	4.97	2.58	1.05	0.10	0.06	50.05	
			BETA	27.35	385.17	1249.54	2230.00	2847.24	3714.85	5817.60	4617.00		
333.36	9.09	1.00	UP	32172.02	25901.85	16906.21	10907.26	7224.26	3825.33	562.79	266.71	49.81	98.78
335		1.00	DOWN	1150.25	68.56	13.91	4.88	2.54	1.15	0.18	0.06	50.10	
			BETA	27.97	377.80	1215.40	2235.09	2844.20	3326.37	3126.61	4445.17		
334.37	9.13	1.00	UP	32248.23	25908.75	16881.54	10894.94	7210.05	3795.46	558.62	261.44	50.03	98.78
336		1.00	DOWN	1172.51	68.20	13.65	4.68	2.52	1.19	0.10	0.02	50.00	
			BETA	27.50	379.89	1236.74	2327.98	2861.13	3189.46	5586.20	13072.00		
335.36	9.06	1.00	UP	32382.77	26027.70	16946.62	10921.11	7214.15	3803.37	556.00	264.51	50.36	98.79
337		1.00	DOWN	1118.45	63.38	13.07	5.17	2.75	1.21	0.16	0.06	49.78	
			BETA	28.95	410.66	1296.60	2112.40	2623.33	3143.28	3475.00	4408.50		
336.37	9.13	1.00	UP	32416.41	26040.07	16930.36	10897.82	7199.40	3798.61	563.92	267.19	49.90	98.82
338		1.00	DOWN	1079.88	62.76	12.62	4.74	2.54	1.35	0.20	0.08	49.89	
			BETA	30.02	414.92	1341.55	2299.12	2834.41	2813.79	2819.60	3339.87		
337.36	9.12	1.00	UP	32566.52	26297.98	17239.95	11131.65	7384.61	3914.84	572.66	270.78	49.82	98.81
339		1.00	DOWN	1128.12	66.00	13.62	5.05	2.65	1.11	0.16	0.06	49.78	
			BETA	28.87	398.45	1265.78	2204.29	2786.65	3526.88	3579.12	4513.00		
338.36	9.14	1.00	UP	32499.93	26162.22	17037.88	10964.49	7249.65	3827.24	566.96	266.71	49.63	98.83
340		1.00	DOWN	1113.50	67.70	13.89	4.86	2.64	1.21	0.12	0.06	49.85	
			BETA	29.19	386.44	1226.63	2256.07	2746.08	3163.01	4724.67	4445.17		
339.35	9.16	1.00	UP	32462.87	26061.64	16933.76	10886.88	7173.73	3773.92	551.87	256.89	49.88	98.84
341		1.00	DOWN	1112.74	70.68	14.57	5.31	2.83	1.39	0.24	0.14	49.98	
			BETA	29.17	368.73	1162.23	2050.26	2534.89	2715.05	2299.46	1834.93		
340.36	9.18	1.00	UP	32592.35	26290.68	17192.21	11105.94	7348.29	3893.55	572.52	271.90	50.14	98.85
342		1.00	DOWN	1096.06	67.96	14.53	5.06	2.74	1.27	0.14	0.06	50.01	
			BETA	29.74	386.86	1183.22	2194.85	2681.86	3065.79	4089.43	4531.67		
341.35	9.24	1.00	UP	32371.75	26213.73	17241.64	11178.27	7407.23	3927.19	569.40	267.13	49.74	98.86
343		1.00	DOWN	1106.01	69.77	14.63	5.30	2.69	1.36	0.30	0.10	49.89	
			BETA	29.27	375.72	1178.51	2109.11	2753.62	2887.64	1898.00	2671.30		
342.36	9.28	1.00	UP	32173.53	25853.47	16876.50	10882.97	7208.77	3796.55	560.12	263.25	49.88	98.88
344		1.00	DOWN	1085.42	68.27	13.90	4.97	2.60	1.05	0.16	0.06	49.81	
			BETA	29.64	378.69	1214.14	2189.73	2772.60	3615.76	3500.75	4387.50		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
343.35	9.27	1.00	UP	32143.89	25828.84	16864.14	10881.42	7194.16	3800.13	562.75	267.14	50.23	98.89
345		1.00	DOWN	1045.78	66.30	14.13	5.70	3.07	1.23	0.14	0.06	50.05	
			BETA	30.74	389.58	1193.50	1909.02	2343.37	3089.54	4019.64	4452.33		
344.35	9.30	1.00	UP	32026.04	25561.89	16541.14	10620.81	6992.16	3669.93	526.03	247.22	49.69	98.89
346		1.00	DOWN	1087.06	70.70	14.64	5.59	3.35	1.49	0.20	0.08	49.73	
			BETA	29.46	361.55	1129.86	1899.97	2087.21	2463.04	2630.15	3090.25		
345.34	9.31	1.00	UP	32072.85	25573.42	16536.20	10591.27	6968.98	3667.93	537.10	254.17	49.87	98.90
347		1.00	DOWN	1092.74	70.13	13.70	4.67	2.57	1.17	0.16	0.12	50.05	
			BETA	29.35	364.66	1207.02	2267.94	2711.67	3134.98	3356.87	2118.08		
346.35	9.41	1.00	UP	32133.15	25769.37	16767.82	10793.33	7133.46	3746.62	535.17	251.89	49.62	98.89
348		1.00	DOWN	1145.06	73.76	14.24	4.92	2.44	1.01	0.16	0.10	49.95	
			BETA	28.06	349.37	1177.52	2193.77	2923.55	3709.52	3344.81	2518.90		
347.34	9.34	1.00	UP	32129.60	25789.48	16793.01	10821.31	7147.84	3761.77	544.74	258.17	50.06	98.88
349		1.00	DOWN	1209.37	77.09	14.06	5.21	2.95	1.29	0.16	0.06	49.98	
			BETA	26.57	334.54	1194.38	2077.03	2423.00	2916.10	3404.62	4302.83		
348.35	9.42	1.00	UP	32169.17	25724.05	16682.25	10703.65	7037.89	3696.47	525.56	243.81	50.24	98.87
350		1.00	DOWN	1187.28	71.38	14.05	4.72	2.48	1.41	0.16	0.10	50.02	
			BETA	27.09	360.38	1187.35	2267.72	2837.86	2621.61	3284.75	2438.10		
349.34	9.43	1.00	UP	32362.42	25945.53	16811.22	10793.96	7112.11	3740.29	538.76	254.83	50.58	98.84
351		1.00	DOWN	1185.75	69.83	13.43	5.43	3.03	1.41	0.24	0.16	50.20	
			BETA	27.29	371.55	1251.77	1987.84	2347.23	2652.69	2244.83	1592.69		
350.34	9.47	1.00	UP	32304.33	25860.30	16716.35	10702.95	7044.73	3712.02	537.11	254.10	50.25	98.83
352		1.00	DOWN	1173.82	67.47	14.07	5.23	2.76	1.29	0.12	0.08	49.97	
			BETA	27.52	383.29	1188.08	2046.45	2552.44	2877.53	4475.92	3176.25		
351.34	9.48	1.00	UP	32549.87	26054.35	16887.65	10839.75	7143.04	3752.79	537.37	251.00	50.44	98.84
353		1.00	DOWN	1204.60	71.06	15.14	5.32	2.79	1.52	0.22	0.08	50.07	
			BETA	27.02	366.65	1115.43	2037.55	2560.23	2468.94	2442.59	3137.50		
352.33	9.54	1.00	UP	32394.91	25976.02	16883.70	10854.18	7153.96	3768.44	548.62	257.55	50.61	98.84
354		1.00	DOWN	1222.64	72.88	14.14	5.31	2.93	1.49	0.18	0.04	49.85	
			BETA	26.50	356.42	1194.04	2044.10	2441.62	2529.15	3047.89	6438.75		
353.33	9.57	1.00	UP	32430.50	25980.99	16846.38	10834.69	7150.13	3762.75	552.43	263.61	50.22	98.85
355		1.00	DOWN	1226.63	74.42	14.29	5.03	2.61	1.19	0.12	0.08	49.75	
			BETA	26.44	349.11	1178.89	2154.01	2739.51	3161.97	4603.58	3295.12		
354.33	9.52	1.00	UP	32381.58	25919.19	16798.26	10766.53	7094.06	3748.58	546.09	257.34	50.27	98.84
356		1.00	DOWN	1158.45	66.09	14.00	4.90	2.88	1.31	0.26	0.16	50.25	
			BETA	27.95	392.18	1199.88	2197.25	2463.22	2861.51	2100.35	1608.37		
355.32	9.55	1.00	UP	32407.71	25797.13	16598.41	10598.49	6958.22	3647.21	534.78	248.92	49.07	98.86
357		1.00	DOWN	1158.90	64.83	13.06	4.88	2.53	1.03	0.06	0.02	49.88	
			BETA	27.96	397.92	1270.93	2171.82	2750.28	3540.98	8913.00	12446.00		
356.33	9.56	1.00	UP	31884.70	25430.04	16433.71	10537.45	6930.68	3650.57	531.50	251.11	49.35	98.87
358		1.00	DOWN	1160.16	66.02	14.24	5.23	2.73	1.09	0.24	0.10	50.06	
			BETA	27.48	385.19	1154.05	2014.81	2538.71	3349.15	2214.58	2511.10		
357.32	9.59	1.00	UP	32021.55	25281.82	16173.36	10298.43	6762.67	3536.64	518.78	245.98	50.00	98.88
359		1.00	DOWN	1159.01	69.08	13.42	4.36	2.04	0.81	0.02	0.00	49.88	
			BETA	27.63	365.98	1205.17	2362.03	3315.03	4366.22	25939.00	99999.99		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
358.32	9.62	1.00	UP	32155.08	25728.44	16719.93	10758.89	7094.93	3734.24	543.70	254.85	50.22	98.89
360		1.00	DOWN	1173.12	69.33	13.59	5.15	2.71	1.11	0.08	0.06	49.81	
			BETA	27.41	371.10	1230.31	2089.10	2618.06	3364.18	6796.25	4247.50		
359.31	9.61	1.00	UP	32038.65	25502.12	16450.16	10522.71	6914.66	3618.04	529.08	252.11	50.12	98.89
361		1.00	DOWN	1099.29	64.53	13.38	4.80	2.75	1.29	0.20	0.04	49.97	
			BETA	29.14	395.20	1229.46	2192.23	2514.42	2804.68	2645.40	6302.75		
360.32	9.71	1.00	UP	32143.55	25643.92	16568.17	10626.27	6982.44	3672.11	530.16	250.28	50.55	98.88
362		1.00	DOWN	1139.14	67.85	13.10	4.63	2.65	0.99	0.12	0.04	49.76	
			BETA	28.22	377.95	1264.75	2295.09	2634.88	3709.20	4418.00	6257.00		
361.31	9.66	1.00	UP	32128.66	25712.90	16693.11	10737.62	7071.56	3727.84	542.26	254.73	50.32	98.93
363		1.00	DOWN	1100.48	64.60	13.65	5.36	2.82	1.23	0.18	0.04	50.25	
			BETA	29.20	398.03	1222.94	2003.29	2507.65	3030.76	3012.56	6368.25		
362.32	9.65	1.00	UP	32110.57	25724.23	16729.27	10758.71	7084.45	3729.00	540.92	254.95	50.03	98.93
364		1.00	DOWN	1111.40	68.20	14.66	5.56	3.07	1.38	0.18	0.10	49.87	
			BETA	28.89	377.19	1141.15	1935.02	2307.64	2702.17	3005.11	2549.50		
363.31	9.72	1.00	UP	32206.41	25794.43	16764.18	10784.93	7111.09	3739.42	547.12	258.49	49.81	98.96
365		1.00	DOWN	1124.47	69.97	14.53	5.67	3.23	1.53	0.18	0.12	49.91	
			BETA	28.64	368.65	1153.76	1902.10	2201.58	2444.07	3039.56	2154.08		
364.31	9.74	1.00	UP	32340.66	26127.02	17138.68	11111.23	7380.49	3900.49	571.34	274.04	50.11	98.99
366		1.00	DOWN	1108.60	70.92	14.75	5.73	2.87	1.27	0.22	0.10	50.23	
			BETA	29.17	368.40	1161.94	1939.13	2571.60	3071.25	2597.00	2740.40		
365.30	9.73	1.00	UP	32027.48	25422.47	16350.11	10443.01	6862.89	3602.81	526.39	251.02	50.18	98.98
367		1.00	DOWN	1032.09	64.61	14.36	5.36	2.85	1.25	0.26	0.14	49.97	
			BETA	31.03	393.48	1138.59	1948.32	2408.03	2882.25	2024.58	1793.00		
366.31	9.72	1.00	UP	31896.07	25070.03	15920.03	10090.18	6567.01	3428.86	496.86	233.47	50.01	98.96
368		1.00	DOWN	1094.81	67.77	14.24	5.35	2.99	1.43	0.10	0.06	49.76	
			BETA	29.13	369.93	1117.98	1886.01	2196.32	2397.80	4968.60	3891.17		
367.30	9.73	1.00	UP	32078.88	25378.88	16249.72	10344.87	6773.27	3556.33	520.15	243.50	49.83	98.99
369		1.00	DOWN	1079.56	67.71	13.73	4.89	2.65	1.13	0.18	0.10	50.17	
			BETA	29.71	374.82	1183.52	2115.52	2555.95	3147.19	2889.72	2435.00		
368.30	9.80	1.00	UP	32139.87	25606.36	16522.50	10572.66	6935.53	3642.29	530.40	248.89	49.95	99.00
370		1.00	DOWN	1082.27	65.89	14.29	5.27	2.87	1.35	0.16	0.08	49.76	
			BETA	29.70	388.62	1156.23	2006.20	2416.56	2697.99	3315.00	3111.12		
369.29	9.76	1.00	UP	32146.32	25644.97	16582.37	10640.90	7005.72	3684.59	533.44	255.22	49.70	98.98
371		1.00	DOWN	1044.50	61.18	14.17	5.33	2.54	1.19	0.24	0.08	49.96	
			BETA	30.78	419.17	1170.24	1996.42	2758.16	3096.29	2222.67	3190.25		
370.30	9.76	1.00	UP	32076.04	25636.83	16620.91	10670.34	7037.35	3699.54	538.68	254.49	49.44	98.94
372		1.00	DOWN	1066.42	63.74	13.84	5.58	2.89	1.37	0.28	0.10	50.08	
			BETA	30.08	402.21	1200.93	1912.25	2435.07	2700.39	1923.86	2544.90		
371.30	9.86	1.00	UP	32045.00	25535.09	16485.13	10559.88	6963.72	3664.66	532.51	252.63	49.92	98.92
373		1.00	DOWN	1091.07	65.04	13.44	5.08	2.76	1.19	0.12	0.10	49.80	
			BETA	29.37	392.61	1226.57	2078.72	2523.09	3079.55	4437.58	2526.30		
372.29	9.82	1.00	UP	32238.62	25880.04	16850.45	10868.42	7180.67	3782.86	542.59	261.13	49.83	98.89
374		1.00	DOWN	1147.54	66.90	13.37	5.27	2.85	1.25	0.16	0.04	49.88	
			BETA	28.09	386.85	1260.32	2062.32	2519.53	3026.29	3391.19	6528.25		

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ID:	FL12-1105	Test Date:	7/12/12		

Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
373.29	9.86	1.00	UP	32001.82	25807.60	16864.11	10890.23	7212.38	3819.96	559.90	262.54	50.21	98.90
375		1.00	DOWN	1124.40	64.08	14.86	5.78	3.08	1.35	0.20	0.08	50.37	
			BETA	28.46	402.74	1134.87	1884.12	2341.68	2829.60	2799.50	3281.75		
374.28	9.90	1.00	UP	32257.35	26011.88	17013.93	11001.40	7291.87	3851.78	555.40	259.61	50.01	98.88
376		1.00	DOWN	1131.26	65.95	14.69	5.14	2.59	1.05	0.14	0.08	49.47	
			BETA	28.51	394.42	1158.20	2140.35	2815.39	3668.36	3967.14	3245.12		
375.29	9.91	1.00	UP	32090.85	25695.76	16681.20	10729.07	7083.14	3731.22	545.54	256.33	49.90	98.90
377		1.00	DOWN	1074.34	63.00	14.70	5.75	3.29	1.70	0.30	0.08	49.94	
			BETA	29.87	407.87	1134.78	1865.93	2152.93	2194.84	1818.47	3204.12		
376.28	9.88	1.00	UP	32318.96	26163.96	17212.53	11181.59	7434.07	3923.37	574.35	271.08	50.58	98.88
378		1.00	DOWN	1117.77	64.47	14.01	4.78	2.52	1.09	0.14	0.06	50.05	
			BETA	28.91	405.83	1228.59	2339.24	2950.03	3599.42	4102.50	4518.00		
377.28	9.96	1.00	UP	32262.74	26174.66	17262.47	11233.98	7484.01	3972.28	576.31	269.37	49.17	98.91
379		1.00	DOWN	1109.70	66.25	15.08	5.88	3.13	1.56	0.26	0.08	50.07	
			BETA	29.07	395.09	1144.73	1910.54	2391.06	2546.33	2216.58	3367.12		
378.28	9.95	1.00	UP	31990.03	25825.99	16906.05	10952.72	7283.37	3867.20	562.57	264.46	48.49	98.91
380		1.00	DOWN	1133.27	68.95	15.29	5.18	2.93	1.29	0.12	0.08	49.98	
			BETA	28.23	374.56	1105.69	2114.42	2485.79	2997.83	4688.08	3305.75		
379.28	9.96	1.00	UP	32068.56	25799.53	16839.21	10883.13	7218.96	3819.02	556.65	263.43	49.58	98.92
381		1.00	DOWN	1091.84	64.06	15.16	5.04	2.90	1.29	0.10	0.02	49.85	
			BETA	29.37	402.74	1110.77	2159.35	2489.30	2960.48	5566.50	13171.50		
380.27	10.00	1.00	UP	32369.30	26071.09	17048.26	11048.02	7313.29	3866.37	566.40	267.98	50.90	98.93
382		1.00	DOWN	1082.41	64.62	14.62	5.43	2.71	1.19	0.10	0.06	50.07	
			BETA	29.90	403.45	1166.09	2034.63	2698.63	3249.05	5664.00	4466.33		
381.28	10.03	1.00	UP	32079.14	25872.47	16945.25	10969.30	7271.91	3841.04	554.77	261.66	50.17	98.93
383		1.00	DOWN	1125.46	71.27	15.43	5.99	3.41	1.69	0.26	0.14	50.07	
			BETA	28.50	363.02	1098.20	1831.27	2132.52	2272.80	2133.73	1869.00		
382.27	10.03	1.00	UP	32121.94	25754.19	16744.74	10803.20	7140.62	3769.46	556.76	263.33	49.34	98.96
384		1.00	DOWN	1093.67	66.13	13.69	4.76	2.58	1.31	0.26	0.22	49.59	
			BETA	29.37	389.45	1223.14	2269.58	2767.68	2877.45	2141.38	1196.95		
383.28	10.11	1.00	UP	32214.19	26098.33	17196.88	11190.37	7449.10	3945.56	583.41	279.06	49.71	98.97
385		1.00	DOWN	1359.19	84.58	15.43	5.43	2.95	1.49	0.16	0.04	50.30	
			BETA	23.70	308.56	1114.51	2060.84	2525.12	2648.03	3646.31	6976.50		
384.27	10.06	1.00	UP	32180.25	26239.78	17412.21	11385.98	7628.44	4071.34	605.59	288.02	49.94	99.02
386		1.00	DOWN	1062.36	66.96	16.20	6.35	3.24	1.50	0.20	0.14	49.97	
			BETA	30.29	391.87	1074.83	1793.07	2354.46	2714.23	3027.95	2057.29		
385.27	10.10	1.00	UP	32197.14	26169.29	17294.03	11289.87	7541.70	4001.73	583.67	272.74	50.44	99.05
387		1.00	DOWN	1016.73	65.46	15.55	5.47	2.95	1.27	0.20	0.10	50.19	
			BETA	31.67	399.78	1112.16	2063.96	2556.51	3150.97	2918.35	2727.40		
386.27	10.11	1.00	UP	32171.26	26084.76	17201.47	11205.77	7462.33	3975.39	577.86	276.13	50.22	99.04
388		1.00	DOWN	1012.44	65.81	15.78	5.80	3.19	1.54	0.12	0.06	49.86	
			BETA	31.78	396.36	1090.08	1932.03	2339.29	2581.42	4815.50	4602.17		
387.26	10.09	1.00	UP	32091.40	25849.31	16926.76	10959.91	7272.32	3843.16	560.63	261.51	49.85	99.08
389		1.00	DOWN	982.01	61.96	14.22	5.69	3.11	1.45	0.22	0.04	50.19	
			BETA	32.68	417.19	1190.35	1926.17	2338.37	2650.46	2548.32	6537.75		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
388.27	10.13	1.00	UP	32010.29	25738.84	16826.71	10892.40	7219.19	3820.98	556.54	264.43	49.76	99.09
390		1.00	DOWN	1003.69	64.84	14.60	5.55	3.15	1.23	0.14	0.04	49.96	
			BETA	31.89	396.96	1152.51	1962.59	2291.81	3106.49	3975.29	6610.75		
389.26	10.16	1.00	UP	32226.98	25868.30	16896.95	10904.08	7214.05	3806.59	560.46	264.61	49.58	99.09
391		1.00	DOWN	979.17	62.37	14.28	5.57	2.93	1.39	0.22	0.14	50.09	
			BETA	32.91	414.76	1183.26	1957.64	2462.13	2738.55	2547.55	1890.07		
390.26	10.15	1.00	UP	32007.25	25868.60	16983.20	11023.14	7329.29	3896.71	571.82	271.02	49.69	99.08
392		1.00	DOWN	1019.15	65.43	14.11	5.09	2.66	1.19	0.08	0.04	50.00	
			BETA	31.41	395.36	1203.63	2165.65	2755.37	3274.55	7147.75	6775.50		
391.25	10.15	1.00	UP	32092.45	25771.77	16805.54	10855.40	7193.20	3792.88	556.32	261.93	49.75	99.07
393		1.00	DOWN	1009.46	63.29	14.66	5.73	3.21	1.41	0.16	0.12	49.83	
			BETA	31.79	407.20	1146.35	1894.49	2240.87	2689.99	3477.00	2182.75		
392.26	10.17	1.00	UP	32209.34	25861.85	16831.83	10862.24	7179.10	3786.82	549.29	257.04	50.26	99.08
394		1.00	DOWN	1047.01	65.33	15.20	5.57	3.05	1.65	0.24	0.12	49.96	
			BETA	30.76	395.86	1107.36	1950.13	2353.80	2295.04	2288.71	2142.00		
393.25	10.26	1.00	UP	32205.94	26155.30	17250.68	11220.39	7479.17	3973.16	577.14	268.26	49.98	99.06
395		1.00	DOWN	1067.60	63.81	14.17	5.79	2.77	1.40	0.18	0.06	50.17	
			BETA	30.17	409.89	1217.41	1937.89	2700.06	2837.97	3206.33	4471.00		
394.25	10.28	1.00	UP	32173.32	26129.19	17291.52	11278.94	7524.20	3975.96	571.69	269.32	49.55	99.05
396		1.00	DOWN	1068.44	68.45	16.58	6.18	3.24	1.77	0.14	0.08	50.71	
			BETA	30.11	381.73	1042.91	1825.07	2322.28	2246.31	4083.50	3366.50		
395.25	10.26	1.00	UP	32249.62	25996.75	17025.89	11035.08	7311.07	3867.96	565.62	266.40	50.48	99.04
397		1.00	DOWN	1110.16	67.04	15.38	5.38	2.85	1.17	0.18	0.10	49.84	
			BETA	29.05	387.78	1107.01	2051.13	2565.29	3305.95	3142.33	2664.00		
396.25	10.27	1.00	UP	32140.11	26034.80	17156.58	11153.61	7416.72	3930.81	573.82	276.50	49.94	99.03
398		1.00	DOWN	1094.11	66.37	15.24	5.67	3.11	1.31	0.24	0.16	50.26	
			BETA	29.38	392.27	1125.76	1967.13	2384.80	3000.62	2390.92	1728.12		
397.24	10.29	1.00	UP	32404.69	26433.76	17534.04	11456.07	7666.42	4085.96	592.08	275.74	49.42	99.03
399		1.00	DOWN	1087.62	65.11	15.60	6.37	3.20	1.83	0.28	0.10	50.10	
			BETA	29.79	405.99	1123.98	1798.44	2395.76	2232.77	2114.57	2757.40		
398.24	10.31	1.00	UP	32049.25	26005.47	17123.56	11148.19	7434.93	3951.07	574.09	269.99	49.61	99.05
400		1.00	DOWN	1090.88	67.91	15.66	5.88	3.35	1.68	0.22	0.10	49.98	
			BETA	29.38	382.94	1093.46	1895.95	2219.38	2351.83	2609.50	2699.90		
399.23	10.34	1.00	UP	32119.00	26017.16	17131.08	11129.68	7404.66	3927.73	570.22	266.60	50.19	99.04
401		1.00	DOWN	1103.82	67.43	15.47	5.72	3.03	1.53	0.34	0.12	50.08	
			BETA	29.10	385.84	1107.37	1945.75	2443.78	2567.14	1677.12	2221.67		
400.24	10.36	1.00	UP	32440.53	26456.43	17563.15	11488.35	7691.86	4091.58	594.06	279.13	50.55	99.04
402		1.00	DOWN	1069.45	67.08	15.54	6.00	3.43	1.39	0.16	0.12	49.94	
			BETA	30.33	394.40	1130.19	1914.73	2242.52	2943.58	3712.87	2326.08		
401.24	10.40	1.00	UP	32190.66	26054.57	17133.61	11145.84	7410.37	3920.73	571.97	270.09	50.15	99.07
403		1.00	DOWN	1076.75	68.10	16.26	6.03	3.28	1.54	0.06	0.06	49.92	
			BETA	29.90	382.59	1053.73	1848.40	2259.26	2545.93	9532.83	4501.50		
402.23	10.35	1.00	UP	32209.81	26166.04	17281.03	11252.12	7511.40	4004.85	581.13	272.43	50.07	99.08
404		1.00	DOWN	1064.67	69.41	16.13	6.18	3.41	1.58	0.22	0.08	49.63	
			BETA	30.25	376.98	1071.36	1820.73	2202.76	2534.72	2641.50	3405.37		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
403.23	10.45	1.00	UP	32189.95	26057.13	17156.09	11133.33	7395.84	3910.57	566.47	264.13	50.04	99.09
405		1.00	DOWN	1047.98	69.18	16.02	5.80	2.88	1.43	0.16	0.02	50.06	
			BETA	30.72	376.66	1070.92	1919.54	2568.00	2734.66	3540.44	13206.50		
404.22	10.45	1.00	UP	32182.01	26068.55	17167.64	11154.34	7424.75	3944.13	577.09	275.05	50.26	99.10
406		1.00	DOWN	1028.82	66.32	15.87	5.98	3.26	1.51	0.24	0.08	50.32	
			BETA	31.28	393.07	1081.77	1865.27	2277.53	2612.01	2404.54	3438.12		
405.23	10.48	1.00	UP	32220.14	26034.60	17101.28	11091.56	7354.82	3900.24	576.85	269.07	50.34	99.10
407		1.00	DOWN	1033.66	66.50	15.73	6.14	3.35	1.62	0.16	0.06	49.75	
			BETA	31.17	391.50	1087.18	1806.44	2195.47	2407.56	3605.31	4484.50		
406.22	10.46	1.00	UP	32215.68	26149.77	17303.80	11293.03	7522.31	4001.98	592.04	280.20	50.60	99.12
408		1.00	DOWN	1018.94	67.65	16.06	6.32	3.64	1.71	0.18	0.08	49.96	
			BETA	31.62	386.55	1077.45	1786.87	2066.57	2340.34	3289.11	3502.50		
407.23	10.47	1.00	UP	32299.71	26366.31	17524.41	11467.55	7671.59	4091.80	593.28	277.79	49.84	99.14
409		1.00	DOWN	1002.89	69.70	16.57	6.65	3.25	1.60	0.26	0.16	50.19	
			BETA	32.21	378.28	1057.60	1724.44	2360.49	2557.37	2281.85	1736.19		
408.22	10.49	1.00	UP	32132.04	25904.83	16957.54	10966.07	7270.35	3844.52	564.20	267.83	50.14	99.17
410		1.00	DOWN	988.97	68.07	15.70	6.34	3.47	1.74	0.26	0.12	49.89	
			BETA	32.49	380.56	1080.10	1729.66	2095.20	2209.49	2170.00	2231.92		
409.22	10.51	1.00	UP	32094.50	25759.32	16795.71	10835.05	7157.74	3771.57	547.29	259.52	49.82	99.19
411		1.00	DOWN	989.19	67.30	15.17	5.29	2.44	1.25	0.26	0.12	49.76	
			BETA	32.45	382.75	1107.17	2048.21	2933.50	3017.26	2104.96	2162.67		
410.21	10.56	1.00	UP	32124.95	25877.87	16912.52	10918.21	7238.87	3829.92	561.93	267.90	50.03	99.20
412		1.00	DOWN	1016.88	68.13	15.70	6.24	3.48	1.74	0.32	0.16	50.42	
			BETA	31.59	379.83	1077.23	1749.71	2080.14	2201.10	1756.03	1674.37		
411.22	10.46	1.00	UP	32234.86	26127.29	17211.91	11193.15	7449.17	3966.83	577.94	273.29	49.95	99.20
413		1.00	DOWN	978.32	64.18	14.78	5.70	2.86	1.17	0.16	0.10	50.00	
			BETA	32.95	407.09	1164.54	1963.71	2604.60	3390.45	3612.13	2732.90		
412.21	10.54	1.00	UP	32233.62	26326.03	17522.89	11472.56	7675.51	4095.39	607.52	285.60	49.96	99.20
414		1.00	DOWN	1006.66	67.64	16.07	6.51	3.33	1.45	0.14	0.06	50.32	
			BETA	32.02	389.21	1090.41	1762.30	2304.96	2824.41	4339.43	4760.00		
413.22	10.58	1.00	UP	32286.51	26397.15	17572.37	11517.28	7709.35	4118.19	608.20	287.98	49.93	99.18
415		1.00	DOWN	1026.20	69.02	16.46	6.42	3.31	1.78	0.24	0.10	49.87	
			BETA	31.46	382.46	1067.58	1793.97	2329.11	2313.59	2534.17	2879.80		
414.22	10.57	1.00	UP	32230.51	26137.79	17217.80	11206.21	7466.82	3950.98	574.38	270.82	49.93	99.20
416		1.00	DOWN	1006.97	67.47	16.01	6.01	3.25	1.63	0.26	0.16	49.97	
			BETA	32.01	387.40	1075.44	1864.59	2297.48	2423.91	2209.15	1692.62		
415.21	10.64	1.00	UP	32256.63	26172.71	17283.27	11233.97	7462.23	3957.63	581.81	277.37	49.99	99.17
417		1.00	DOWN	1023.29	67.53	16.64	6.82	4.05	1.67	0.24	0.08	49.69	
			BETA	31.52	387.57	1038.66	1647.21	1842.53	2369.84	2424.21	3467.12		
416.20	10.66	1.00	UP	32185.07	25881.70	16877.56	10895.90	7208.56	3797.05	557.06	263.47	49.53	99.17
418		1.00	DOWN	1085.20	71.16	16.69	6.67	3.40	1.80	0.14	0.08	49.97	
			BETA	29.66	363.71	1011.24	1633.57	2120.16	2109.47	3979.00	3293.38		
417.21	10.70	1.00	UP	32062.84	25838.86	16908.31	10945.48	7259.14	3842.60	564.30	267.04	50.59	99.17
419		1.00	DOWN	1059.55	71.42	16.53	6.14	3.40	1.62	0.14	0.08	49.97	
			BETA	30.26	361.79	1022.89	1782.65	2135.04	2371.98	4030.71	3338.00		

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ID:	FL12-1105	Test Date:	7/12/12		

Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
418.21	10.71	1.00	UP	32271.88	25985.57	16978.75	10969.90	7268.75	3841.68	562.55	267.73	49.82	99.23
420		1.00	DOWN	1016.97	66.67	14.93	5.79	2.81	1.19	0.22	0.06	50.08	
			BETA	31.73	389.76	1137.22	1894.63	2586.74	3228.30	2557.05	4462.17		
419.21	10.68	1.00	UP	32123.70	25780.73	16766.11	10802.66	7133.72	3774.26	554.70	260.33	49.98	99.23
421		1.00	DOWN	1018.76	67.13	15.55	5.87	3.29	1.67	0.24	0.12	50.08	
			BETA	31.53	384.04	1078.21	1840.32	2168.30	2260.04	2311.25	2169.42		
420.20	10.70	1.00	UP	32155.49	25856.30	16871.92	10893.83	7209.58	3800.86	552.02	263.01	50.19	99.25
422		1.00	DOWN	989.66	65.70	15.80	6.18	3.19	1.51	0.30	0.16	49.96	
			BETA	32.49	393.55	1067.84	1762.76	2260.06	2517.13	1840.07	1643.81		
421.20	10.76	1.00	UP	32279.23	26155.96	17248.37	11220.56	7480.40	3968.66	586.10	276.70	50.11	99.27
423		1.00	DOWN	1049.57	71.24	16.25	6.59	3.58	1.74	0.20	0.16	49.83	
			BETA	30.75	367.15	1061.44	1702.66	2089.50	2280.84	2930.50	1729.37		
422.19	10.76	1.00	UP	32201.91	26170.70	17293.89	11260.86	7488.48	3962.59	585.03	275.35	49.94	99.28
424		1.00	DOWN	1019.89	70.76	15.84	5.96	3.08	1.27	0.10	0.06	50.08	
			BETA	31.57	369.85	1091.79	1889.41	2431.32	3120.15	5850.30	4589.17		
423.20	10.79	1.00	UP	32200.70	26055.16	17145.63	11145.78	7400.88	3916.79	573.76	262.17	50.26	99.29
425		1.00	DOWN	973.24	67.82	15.69	6.08	3.53	1.49	0.18	0.10	49.97	
			BETA	33.09	384.18	1092.77	1833.19	2096.57	2628.72	3187.56	2621.70		
424.19	10.74	1.00	UP	32084.90	25797.17	16826.59	10856.85	7177.32	3783.63	560.43	263.95	50.75	99.32
426		1.00	DOWN	966.13	65.68	15.33	6.23	3.33	1.63	0.24	0.10	50.01	
			BETA	33.21	392.77	1097.62	1742.67	2155.35	2321.25	2335.12	2639.50		
425.20	10.84	1.00	UP	32153.71	25990.11	17054.03	11048.01	7344.60	3901.34	569.60	266.37	49.79	99.30
427		1.00	DOWN	981.90	70.70	15.71	6.30	3.31	1.54	0.12	0.08	50.08	
			BETA	32.75	367.61	1085.55	1753.65	2218.91	2533.34	4746.67	3329.62		
426.19	10.88	1.00	UP	32068.00	25794.28	16811.46	10841.73	7185.03	3795.91	557.38	266.48	49.87	99.32
428		1.00	DOWN	942.56	66.71	15.30	5.47	3.09	1.35	0.16	0.04	49.86	
			BETA	34.02	386.66	1098.79	1982.03	2325.25	2811.79	3483.62	6662.00		
427.19	10.80	1.00	UP	32170.08	25900.27	16938.26	10951.38	7253.65	3831.40	558.11	264.77	49.55	99.32
429		1.00	DOWN	937.90	66.37	16.83	6.78	3.79	1.80	0.26	0.16	50.08	
			BETA	34.30	390.24	1006.43	1615.25	1913.89	2128.56	2146.58	1654.81		
428.19	10.92	1.00	UP	32179.86	26014.79	17065.50	11069.24	7361.71	3909.42	568.02	268.11	49.95	99.33
430		1.00	DOWN	975.03	69.17	16.61	6.24	3.37	1.72	0.30	0.18	49.90	
			BETA	33.00	376.10	1027.42	1773.92	2184.48	2272.92	1893.40	1489.50		
429.18	10.85	1.00	UP	32047.18	25667.48	16687.39	10727.63	7077.35	3735.63	546.64	257.05	50.18	99.32
431		1.00	DOWN	933.12	63.83	15.05	6.05	3.17	1.53	0.18	0.06	50.14	
			BETA	34.34	402.12	1108.80	1773.16	2232.60	2441.59	3036.89	4284.17		
430.19	10.94	1.00	UP	32195.21	26087.72	17174.43	11154.64	7425.21	3948.57	576.93	269.92	50.07	99.30
432		1.00	DOWN	1015.17	72.80	16.90	7.01	3.55	1.45	0.22	0.16	49.95	
			BETA	31.71	358.35	1016.24	1591.25	2091.61	2723.15	2622.41	1687.00		
431.18	10.93	1.00	UP	32137.64	25907.24	16953.18	10972.75	7279.57	3853.66	561.49	267.88	50.43	99.31
433		1.00	DOWN	991.45	68.86	16.57	7.01	3.93	1.95	0.32	0.10	50.68	
			BETA	32.41	376.23	1023.12	1565.30	1852.31	1976.24	1754.66	2678.80		
432.18	10.92	1.00	UP	32113.49	25933.89	17007.09	11015.75	7306.93	3881.86	570.06	272.04	49.90	99.29
434		1.00	DOWN	1000.96	67.54	15.76	6.18	3.23	1.37	0.22	0.10	49.96	
			BETA	32.08	383.98	1079.13	1782.48	2262.21	2833.47	2591.18	2720.40		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
433.18	10.93	1.00	UP	32218.38	25915.12	16862.59	10872.26	7191.35	3787.46	553.00	261.03	51.19	99.30
435		1.00	DOWN	1025.48	66.23	15.70	5.93	3.17	1.37	0.06	0.00	49.93	
			BETA	31.42	391.29	1074.05	1833.43	2268.56	2764.57	9216.67	99999.99		
434.18	10.96	1.00	UP	32068.32	25679.91	16663.40	10723.36	7085.32	3729.13	546.46	256.79	49.83	99.30
436		1.00	DOWN	1115.93	74.45	16.28	5.99	3.19	1.62	0.38	0.14	49.81	
			BETA	28.74	344.93	1023.55	1790.21	2221.10	2301.93	1438.05	1834.21		
435.18	10.99	1.00	UP	32084.56	25835.15	16860.99	10865.86	7194.13	3804.25	555.68	261.53	51.11	99.31
437		1.00	DOWN	1101.43	71.20	17.42	6.69	3.61	1.81	0.28	0.08	50.00	
			BETA	29.13	362.85	967.91	1624.19	1992.83	2101.80	1984.57	3269.12		
436.18	11.05	1.00	UP	32222.22	25808.11	16794.86	10828.98	7153.33	3775.81	551.26	261.54	49.19	99.30
438		1.00	DOWN	1063.16	68.37	16.09	5.94	3.01	1.58	0.22	0.16	49.71	
			BETA	30.31	377.48	1043.81	1823.06	2376.52	2389.75	2505.73	1634.62		
437.17	11.07	1.00	UP	32161.27	25957.75	16992.24	11014.97	7320.47	3888.11	572.64	270.03	50.56	99.30
439		1.00	DOWN	1067.29	71.19	16.65	5.99	3.29	1.72	0.26	0.12	50.09	
			BETA	30.13	364.63	1020.55	1838.89	2225.07	2260.53	2202.46	2250.25		
438.17	11.09	1.00	UP	32101.69	25767.82	16773.19	10806.91	7121.31	3737.38	536.19	253.91	50.27	99.30
440		1.00	DOWN	1076.51	72.06	16.48	6.34	3.23	1.43	0.26	0.14	50.03	
			BETA	29.82	357.59	1017.79	1704.56	2204.74	2613.55	2062.27	1813.64		
439.16	11.06	1.00	UP	32206.03	26127.34	17215.91	11192.68	7443.77	3951.44	575.55	273.42	50.26	99.31
441		1.00	DOWN	1077.93	71.06	16.61	6.30	3.35	1.37	0.18	0.08	50.19	
			BETA	29.88	367.68	1036.48	1776.62	2222.02	2884.26	3197.50	3417.75		
440.17	11.11	1.00	UP	32249.43	26003.17	17000.43	10993.00	7278.84	3850.84	571.95	270.53	50.83	99.30
442		1.00	DOWN	1094.95	75.92	17.51	6.72	3.53	1.71	0.26	0.10	49.97	
			BETA	29.45	342.51	970.90	1635.86	2061.99	2251.95	2199.81	2705.30		
441.16	11.15	1.00	UP	32134.07	25745.88	16713.57	10750.80	7096.52	3756.79	549.81	256.94	50.28	99.30
443		1.00	DOWN	1163.38	79.58	17.07	6.68	3.67	1.88	0.20	0.14	50.25	
			BETA	27.62	323.52	979.12	1609.40	1933.66	1998.29	2749.05	1835.29		
442.17	11.15	1.00	UP	32144.09	25728.06	16652.23	10709.76	7061.93	3719.67	543.08	258.14	49.91	99.35
444		1.00	DOWN	1103.71	78.19	17.70	6.87	3.72	1.52	0.22	0.06	49.97	
			BETA	29.12	329.05	940.80	1558.92	1898.37	2447.15	2468.55	4302.33		
443.16	11.15	1.00	UP	32145.43	25591.83	16502.12	10550.09	6933.66	3642.10	535.28	253.92	50.28	99.34
445		1.00	DOWN	1037.83	70.14	16.71	6.61	3.60	1.56	0.26	0.10	50.34	
			BETA	30.97	364.87	987.56	1596.08	1926.02	2334.68	2058.77	2539.20		
444.16	11.15	1.00	UP	32066.39	25591.29	16513.28	10573.03	6957.83	3664.92	534.75	254.25	49.55	99.38
446		1.00	DOWN	994.90	68.36	16.77	6.66	3.25	1.74	0.22	0.10	50.10	
			BETA	32.23	374.36	984.69	1587.54	2140.87	2106.28	2430.68	2542.50		
445.15	11.17	1.00	UP	32376.76	26211.62	17241.71	11206.27	7436.33	3944.04	592.31	285.70	50.45	99.39
447		1.00	DOWN	1034.26	75.01	16.94	6.28	3.21	1.17	0.18	0.10	49.87	
			BETA	31.30	349.44	1017.81	1784.44	2316.61	3370.97	3290.61	2857.00		
446.16	11.23	1.00	UP	32187.17	26168.00	17286.59	11281.80	7542.53	4019.74	589.83	283.48	50.50	99.45
448		1.00	DOWN	986.41	68.92	16.77	6.81	3.60	1.41	0.30	0.14	49.97	
			BETA	32.63	379.69	1030.80	1656.65	2095.15	2850.88	1966.10	2024.86		
447.15	11.21	1.00	UP	32250.59	26041.51	17098.99	11115.77	7379.01	3909.48	583.34	280.32	50.13	99.46
449		1.00	DOWN	993.54	72.11	16.94	6.54	3.41	1.53	0.22	0.14	50.01	
			BETA	32.46	361.14	1009.39	1699.66	2163.93	2555.22	2651.55	2002.29		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
448.15	11.24	1.00	UP	32157.88	26023.42	17131.23	11154.21	7433.10	3958.73	592.64	288.84	49.60	99.48
450		1.00	DOWN	973.65	71.59	17.09	7.29	4.10	1.92	0.30	0.16	50.03	
			BETA	33.03	363.51	1002.41	1530.07	1812.95	2061.84	1975.47	1805.25		
449.15	11.28	1.00	UP	32098.60	25934.26	17011.92	11054.67	7337.12	3883.92	570.74	273.73	50.39	99.51
451		1.00	DOWN	991.24	71.86	16.81	6.60	3.41	1.41	0.16	0.04	49.98	
			BETA	32.38	360.90	1012.01	1674.95	2151.65	2754.55	3567.12	6843.25		
450.14	11.30	1.00	UP	32057.82	25763.66	16819.02	10868.54	7204.49	3816.99	561.79	270.94	49.73	99.51
452		1.00	DOWN	964.11	68.29	15.88	6.59	3.60	1.50	0.28	0.06	49.97	
			BETA	33.25	377.27	1059.13	1649.25	2001.25	2544.66	2006.39	4515.67		
451.15	11.31	1.00	UP	32027.21	25598.15	16593.89	10665.35	7037.17	3715.96	551.25	264.02	50.03	99.50
453		1.00	DOWN	964.57	69.40	15.84	5.90	3.37	1.43	0.30	0.12	49.82	
			BETA	33.20	368.85	1047.59	1807.69	2088.18	2598.57	1837.50	2200.17		
452.14	11.30	1.00	UP	32272.23	26238.56	17356.44	11315.75	7553.77	4031.90	596.45	284.09	50.00	99.48
454		1.00	DOWN	973.86	71.50	17.92	6.82	3.51	1.37	0.22	0.16	49.96	
			BETA	33.14	366.97	968.55	1659.20	2152.07	2942.99	2711.14	1775.56		
453.15	11.31	1.00	UP	32176.11	25950.16	16987.87	11003.65	7300.59	3870.96	579.30	277.08	49.88	99.50
455		1.00	DOWN	1035.66	73.82	18.19	6.82	3.41	1.53	0.26	0.10	50.00	
			BETA	31.07	351.53	933.91	1613.44	2140.94	2530.04	2228.08	2770.80		
454.14	11.37	1.00	UP	32241.46	26069.98	17111.56	11103.70	7379.05	3920.09	575.42	271.47	50.12	99.48
456		1.00	DOWN	1060.15	73.42	16.71	6.18	3.55	1.78	0.18	0.10	50.11	
			BETA	30.41	355.08	1024.03	1796.72	2078.61	2202.30	3196.78	2714.70		
455.14	11.34	1.00	UP	32244.50	25998.92	17012.99	10993.93	7280.31	3851.46	566.93	273.54	50.64	99.47
457		1.00	DOWN	1019.71	69.61	18.07	7.10	3.73	1.73	0.30	0.12	49.94	
			BETA	31.62	373.49	941.50	1548.44	1951.83	2226.28	1889.77	2279.50		
456.14	11.37	1.00	UP	32288.04	26178.74	17235.29	11222.88	7470.63	3986.43	589.37	283.78	49.91	99.43
458		1.00	DOWN	1049.88	69.85	17.22	6.22	3.25	1.62	0.18	0.08	50.18	
			BETA	30.75	374.79	1000.89	1804.32	2298.66	2460.76	3274.28	3547.25		
457.13	11.36	1.00	UP	32187.08	25791.46	16741.99	10765.82	7110.15	3755.50	553.23	261.70	50.14	99.46
459		1.00	DOWN	1086.40	73.25	17.45	6.82	3.62	1.74	0.12	0.06	49.97	
			BETA	29.63	352.10	959.43	1578.57	1964.13	2158.33	4610.25	4361.67		
458.13	11.43	1.00	UP	32268.39	25921.63	16892.93	10910.37	7218.46	3822.66	565.17	268.15	50.43	99.44
460		1.00	DOWN	1099.24	75.21	16.93	6.22	3.44	1.68	0.34	0.18	50.05	
			BETA	29.36	344.66	997.81	1754.08	2098.39	2275.39	1662.26	1489.72		
459.12	11.42	1.00	UP	32270.03	26148.32	17194.72	11177.15	7439.14	3951.48	574.25	272.97	49.88	99.43
461		1.00	DOWN	1106.10	77.05	19.53	8.03	4.08	1.90	0.26	0.12	49.98	
			BETA	29.17	339.37	880.43	1391.92	1823.32	2079.73	2208.65	2274.75		
460.13	11.42	1.00	UP	32202.04	25875.87	16857.44	10873.28	7195.06	3801.99	560.85	266.01	49.89	99.44
462		1.00	DOWN	1079.48	74.21	18.42	6.52	3.63	1.76	0.20	0.08	50.08	
			BETA	29.83	348.68	915.17	1667.68	1982.11	2160.22	2804.25	3325.12		
461.12	11.50	1.00	UP	32396.46	26494.36	17624.36	11541.32	7730.15	4139.52	620.38	297.33	49.84	99.47
463		1.00	DOWN	1081.32	76.26	17.88	6.77	3.52	1.60	0.14	0.04	50.42	
			BETA	29.96	347.42	985.70	1704.77	2196.07	2587.20	4431.29	7433.25		
462.12	11.55	1.00	UP	32274.55	26284.12	17378.66	11348.86	7581.28	4036.88	594.26	279.23	49.86	99.46
464		1.00	DOWN	1053.28	73.83	18.66	6.98	3.73	1.69	0.24	0.14	50.07	
			BETA	30.64	356.01	931.33	1625.91	2032.51	2388.69	2476.08	1994.50		

P/N: 1R-0749
ID: FL12-1105

Test No.: MUL00469
Test Date: 7/12/12

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
463.12	11.55	1.00	UP	32238.59	26216.94	17336.34	11329.01	7558.69	4023.59	597.28	283.84	50.38	99.48
465		1.00	DOWN	1030.26	72.49	17.57	6.91	3.92	1.49	0.28	0.12	49.97	
			BETA	31.29	361.66	986.70	1639.51	1928.24	2700.40	2133.14	2365.33		
464.12	11.54	1.00	UP	32345.05	26122.27	17157.35	11145.41	7406.23	3927.38	572.86	267.88	50.30	99.49
466		1.00	DOWN	1027.20	74.79	17.82	6.69	3.50	1.60	0.18	0.10	50.13	
			BETA	31.49	349.27	962.81	1665.98	2116.07	2454.61	3182.56	2678.80		
465.11	11.58	1.00	UP	32270.37	26331.39	17474.82	11438.45	7657.98	4093.04	611.93	291.13	49.91	99.49
467		1.00	DOWN	1024.45	75.66	18.94	6.90	3.59	1.75	0.28	0.18	50.03	
			BETA	31.50	348.02	922.64	1657.75	2133.14	2338.88	2185.46	1617.39		
466.12	11.55	1.00	UP	32268.56	26307.30	17438.40	11398.13	7624.13	4058.42	598.80	284.57	50.17	99.51
468		1.00	DOWN	1004.39	74.32	18.89	6.93	3.79	1.83	0.28	0.18	50.36	
			BETA	32.13	353.97	923.16	1644.75	2011.64	2217.72	2138.57	1580.94		
467.11	11.61	1.00	UP	32283.50	26343.42	17482.52	11431.97	7655.77	4084.94	598.80	283.83	49.58	99.51
469		1.00	DOWN	984.81	73.13	18.64	6.79	3.68	1.51	0.18	0.04	49.88	
			BETA	32.78	360.23	937.90	1683.65	2080.37	2705.26	3326.67	7095.75		
468.11	11.66	1.00	UP	32308.14	26407.42	17552.64	11528.16	7713.83	4115.64	605.07	290.13	49.88	99.53
470		1.00	DOWN	1033.78	79.09	19.33	7.22	3.75	1.71	0.28	0.16	50.02	
			BETA	31.25	333.89	908.05	1596.70	2057.02	2406.81	2160.96	1813.31		
469.11	11.62	1.00	UP	32128.65	25951.87	17020.51	11034.12	7320.47	3876.56	564.19	264.07	49.94	99.53
471		1.00	DOWN	955.13	69.50	17.38	7.17	3.75	1.76	0.20	0.12	49.98	
			BETA	33.64	373.41	979.32	1538.93	1952.13	2202.59	2820.95	2200.58		
470.10	11.59	1.00	UP	32096.64	25899.82	16998.88	11016.38	7308.35	3861.79	557.17	263.72	49.84	99.52
472		1.00	DOWN	927.02	70.91	18.32	7.13	3.80	1.68	0.20	0.02	49.83	
			BETA	34.62	365.25	927.89	1545.07	1923.25	2298.68	2785.85	13186.00		
471.11	11.51	1.00	UP	32254.28	26201.95	17341.77	11309.76	7536.74	4014.86	596.30	281.98	50.37	99.53
473		1.00	DOWN	862.02	66.28	18.21	7.04	3.63	1.65	0.16	0.06	49.90	
			BETA	37.42	395.32	952.32	1606.50	2076.24	2433.25	3726.87	4699.67		
472.10	11.50	1.00	UP	32286.18	26356.54	17532.87	11467.79	7668.86	4088.66	608.01	287.24	50.05	99.53
474		1.00	DOWN	817.28	61.58	16.62	6.60	3.64	1.58	0.22	0.16	49.75	
			BETA	39.50	428.00	1054.93	1737.54	2106.83	2587.76	2763.68	1795.25		
473.11	11.54	1.00	UP	32293.57	26452.54	17639.51	11586.66	7764.86	4142.60	601.80	281.67	50.07	99.52
475		1.00	DOWN	812.38	60.82	17.53	6.96	3.63	1.45	0.18	0.10	50.07	
			BETA	39.75	434.93	1006.25	1664.75	2139.08	2856.97	3343.33	2816.70		
474.10	11.55	1.00	UP	32220.62	26149.27	17241.56	11238.73	7486.59	3985.67	583.44	277.33	49.88	99.50
476		1.00	DOWN	826.33	62.37	17.04	6.74	3.79	1.78	0.18	0.02	49.88	
			BETA	38.99	419.26	1011.83	1667.47	1975.35	2239.14	3241.33	13866.50		
475.10	11.54	1.00	UP	32197.20	26070.91	17133.33	11122.18	7397.35	3923.97	572.18	270.48	49.86	99.47
477		1.00	DOWN	832.96	60.28	17.42	6.79	3.83	1.96	0.22	0.10	49.68	
			BETA	38.65	432.50	983.54	1638.02	1931.42	2002.03	2600.82	2704.80		
476.11	11.57	1.00	UP	32299.94	26246.15	17329.36	11289.43	7535.82	4006.09	595.59	280.90	49.97	99.49
478		1.00	DOWN	905.61	65.71	17.24	7.16	3.68	1.66	0.22	0.06	49.92	
			BETA	35.67	399.42	1005.18	1576.74	2047.78	2413.31	2707.23	4681.67		
477.10	11.61	1.00	UP	32309.58	26261.71	17339.00	11288.49	7535.73	4006.26	596.71	281.71	50.02	99.43
479		1.00	DOWN	924.01	66.05	16.43	6.66	3.65	1.80	0.28	0.14	50.02	
			BETA	34.97	397.60	1055.33	1694.97	2064.58	2225.70	2131.11	2012.21		

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ID: FL12-1105

Test No.: MUL00469
Test Date: 7/12/12

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
478.09	11.64	1.00	UP	32367.23	26433.11	17557.31	11490.46	7678.64	4101.22	598.88	285.83	50.32	99.39
480		1.00	DOWN	947.50	66.52	15.84	5.93	3.57	1.51	0.14	0.04	50.04	
			BETA	34.16	397.37	1108.42	1937.68	2150.88	2716.04	4277.71	7145.75		
479.10	11.58	1.00	UP	32316.57	26300.81	17375.80	11342.16	7565.89	4026.26	586.54	277.04	49.75	99.36
481		1.00	DOWN	948.71	66.48	18.11	7.51	4.18	1.98	0.26	0.08	49.83	
			BETA	34.06	395.62	959.46	1510.27	1810.02	2033.46	2255.92	3463.00		
480.09	11.64	1.00	UP	32339.27	26316.65	17404.18	11349.70	7572.95	4023.61	588.60	282.03	49.76	99.38
482		1.00	DOWN	997.48	68.15	18.36	7.22	4.12	1.86	0.18	0.06	50.09	
			BETA	32.42	386.16	947.94	1571.98	1838.09	2163.23	3270.00	4700.50		
481.09	11.65	1.00	UP	32219.92	26075.87	17121.14	11105.83	7393.41	3929.78	580.26	273.84	50.39	99.35
483		1.00	DOWN	1005.29	67.53	17.60	7.21	4.06	1.86	0.20	0.02	50.31	
			BETA	32.05	386.14	972.79	1540.34	1821.04	2112.78	2901.30	13692.00		
482.08	11.73	1.00	UP	32347.96	26330.94	17423.12	11374.51	7603.11	4048.18	593.39	278.85	50.11	99.36
484		1.00	DOWN	1021.97	73.29	19.68	7.74	4.04	1.78	0.38	0.20	50.13	
			BETA	31.65	359.27	885.32	1469.57	1881.96	2274.26	1561.55	1394.25		
483.09	11.76	1.00	UP	32261.49	25983.68	16968.21	10971.87	7289.17	3845.49	558.12	262.02	50.03	99.37
485		1.00	DOWN	1002.82	68.67	18.39	7.48	3.98	1.92	0.22	0.12	49.91	
			BETA	32.17	378.38	922.69	1466.83	1831.45	2002.86	2536.91	2183.50		
484.08	11.77	1.00	UP	32461.06	26494.59	17588.05	11505.57	7687.64	4103.77	601.38	288.52	49.71	99.35
486		1.00	DOWN	1013.89	68.42	17.77	7.25	3.80	1.70	0.12	0.08	50.08	
			BETA	32.02	387.23	989.76	1586.98	2023.06	2413.98	5011.50	3606.50		
485.08	11.77	1.00	UP	32415.58	26540.96	17686.06	11627.61	7809.62	4174.38	611.34	288.37	49.72	99.34
487		1.00	DOWN	1010.19	71.94	18.14	7.27	3.94	2.02	0.22	0.04	49.98	
			BETA	32.09	368.93	974.98	1599.40	1982.14	2066.52	2778.82	7209.25		
486.07	11.76	1.00	UP	32356.46	26436.70	17602.62	11520.46	7714.71	4118.43	603.82	283.56	49.66	99.36
488		1.00	DOWN	1003.16	70.38	18.65	7.09	4.02	1.72	0.22	0.04	49.96	
			BETA	32.25	375.63	943.84	1624.89	1919.08	2394.44	2744.64	7089.00		
487.08	11.80	1.00	UP	32251.87	26192.44	17295.75	11289.91	7528.48	4007.47	590.45	281.02	49.81	99.34
489		1.00	DOWN	1031.75	71.53	18.37	6.84	3.80	1.78	0.22	0.10	49.81	
			BETA	31.26	366.17	941.52	1650.57	1981.18	2251.39	2683.86	2810.20		
488.07	11.83	1.00	UP	32310.68	26079.69	17110.61	11092.33	7367.32	3903.27	585.26	276.83	50.25	99.38
490		1.00	DOWN	1008.74	73.40	18.93	7.62	3.90	1.96	0.36	0.16	49.98	
			BETA	32.03	355.31	903.89	1455.69	1889.06	1991.46	1625.72	1730.19		
489.07	11.87	1.00	UP	32192.88	26122.88	17202.46	11185.46	7459.25	3978.86	584.92	278.04	49.94	99.37
491		1.00	DOWN	1026.87	74.75	19.23	7.06	3.60	1.64	0.18	0.14	50.07	
			BETA	31.35	349.47	894.56	1584.34	2072.01	2426.13	3249.56	1986.00		
490.06	11.91	1.00	UP	32375.88	26443.20	17595.39	11538.82	7720.28	4108.28	601.35	287.52	49.87	99.37
492		1.00	DOWN	1018.74	75.15	18.39	7.25	4.20	1.78	0.22	0.10	50.79	
			BETA	31.78	351.87	956.79	1591.56	1838.16	2308.02	2733.41	2875.20		
491.07	11.91	1.00	UP	32364.77	26419.67	17549.98	11473.45	7669.26	4096.58	610.68	292.28	50.18	99.38
493		1.00	DOWN	999.32	74.11	19.06	7.22	3.68	1.84	0.16	0.06	50.03	
			BETA	32.39	356.49	920.78	1589.12	2084.04	2226.40	3816.75	4871.33		
492.06	11.88	1.00	UP	32377.89	26352.22	17474.24	11407.24	7615.75	4068.99	605.80	285.32	50.11	99.39
494		1.00	DOWN	943.59	69.16	17.92	7.01	3.64	1.49	0.14	0.04	50.11	
			BETA	34.31	381.03	975.12	1627.28	2092.24	2730.87	4327.14	7133.00		

P/N:	1R-0749	Test No.:	MUL00469	Page #	35
ID:	FL12-1105	Test Date:	7/12/12		

Particle Counts

[illegible]

P/N: 1R-0749

ID: FL12-1105

Test No.: MUL00469

Test Date: 7/12/12

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UNCLASSIFIED

APPENDIX D. ISO 19438 TEST RESULTS

Filter: FL12-1142, CAT 1R-0751

Vehicle: MRAP

UNCLASSIFIED

TARDEC

FILTER ELEMENT MULTI-PASS TEST REPORT SHEET

ISO/DIS 19438

TEST No. :	MUL00468
TEST DATE :	7/12/12
OPERATOR :	RVL

TEST CONTAMINANT	
TYPE :	A-3
BATCH No. :	5544Q

FILTER AND ELEMENT IDENTIFICATION	
P/N :	1R-0751
ELEMENT ID :	FL12-1142
HOUSING ID :	
ELEMENT TYPE :	Spin on
MIN. ELEMENT BUBBLE POINT (in. H2O) :	0.00
BUBBLE POINT TO ISO 2942 (in. H2O) :	0.00
WETTING FLUID :	ALCOHOL

TEST SYSTEM	
FLOW RATE (gpm) :	1.50
INITIAL VOLUME (L) :	11.00
FINAL VOLUME (L) :	11.00

UPSTREAM CONCENTRATION (mg/L)			
BASE :	51.30	80% :	35.00

DIFFERENTIAL PRESSURE DATA	
TERMINAL ELEMENT (psid) :	10.00
FILTER HOUSING (psid) :	2.41
CLEAN ASSEMBLY (psid) :	2.22
CLEAN ELEMENT (psid) :	-0.19
NET (psid) :	10.19

TEST FLUID	
TYPE :	Shell
REF :	5606
BATCH No. :	4055728
VISCOSITY (cSt) :	15.00
TEMPERATURE (oF) :	100.00
ANTI-STATIC TYPE ADDED :	Stadis 450
CONDUCTIVITY (pS/m) :	1500.00

INJECTION SYSTEM			
	INITIAL	FINAL	AVERAGE
FLOW (L/min)	0.296	0.249	0.272
CONCEN. (mg/L)	1068.000	1070.000	1069.000

RETENTION CAPACITY (gram)			
TEST DUST			
INJECTED :	44.37	RETAINED :	44.67

COUNTING SYSTEM	COUNTER AND SENSOR REF.	FLOW RATE (ml/min)	DILUTION RATIO
UPSTREAM	Met One	50	None
DOWNSTREAM	Met One	50	None

COUNTER CALIBRATION METHOD	COUNTER CALIBRATION DATE
ISO 11171	6/30/12

DIFFERENTIAL PRESSURE VERSUS CONTAMINANT ADDED

% NET PRESSURE	TEST TIME (min)	ELEMENT DP (psid)	INJECTED MASS (gram)
5%	19.44	0.32	5.66
10%	30.25	0.83	8.81
15%	35.90	1.34	10.46
20%	40.97	1.85	11.93
40%	64.34	3.89	18.74
80%	113.21	7.96	32.98
100%	152.33	10.00	44.37

EFFICIENCY DATA

	4.0 um(c)	6.0 um(c)	8.0 um(c)	10.0 um(c)	12.0 um(c)	15.0 um(c)	25.0 um(c)	30.0 um(c)
MAX. EFF. (%)	73.84	94.92	98.94	99.36	99.45	99.51	99.50	99.47
MIN. EFF. (%)	23.55	82.61	88.77	91.95	93.02	93.72	94.10	94.38
AVG. EFF. (%)	60.25	88.31	93.10	95.15	95.81	96.25	96.54	96.58

EFFICIENCY (%)	50.0	75.0	90.0	95.0	99.0
PARTICLE SIZE um(c)	----	4.8	6.6	9.8	----

REMARKS

**TARDEC
FILTER ELEMENT MULTI-PASS TEST REPORT SHEET
ISO/DIS 19438**

P/N :	1R-0751	TEST No. :	MUL00468
ID :	FL12-1142	TEST DATE :	7/12/12

PARTICLE DISTRIBUTION ANALYSIS (PARTICLES/MILLILITER)

Sample Point		4.0 um(c)	6.0 um(c)	8.0 um(c)	10.0 um(c)	12.0 um(c)	15.0 um(c)	25.0 um(c)	30.0 um(c)
Initial		661.68	7.17	0.31	0.08	0.04	0.03	0.00	0.00
9.97 min	UP	32078.61	23928.78	14378.55	8799.67	5616.65	2895.43	413.06	191.54
0.18 (psid)	DOWN	22821.54	1621.22	152.91	56.09	30.63	14.22	2.09	1.11
	EFF.(%)	28.86	93.22	98.94	99.36	99.45	99.51	99.49	99.42
19.95 min	UP	32523.71	25314.55	15892.32	10019.39	6531.99	3423.44	499.69	233.16
0.34 (psid)	DOWN	24865.51	1633.18	181.95	72.40	39.80	18.24	2.49	1.23
	EFF.(%)	23.55	93.55	98.86	99.28	99.39	99.47	99.50	99.47
29.94 min	UP	32377.33	25350.72	16058.60	10175.12	6656.58	3493.51	505.78	237.22
0.79 (psid)	DOWN	22204.16	1288.92	257.75	110.46	61.92	28.89	3.85	1.85
	EFF.(%)	31.42	94.92	98.39	98.91	99.07	99.17	99.24	99.22
39.92 min	UP	32154.73	25224.58	16017.57	10169.60	6655.02	3493.31	506.76	237.85
1.76 (psid)	DOWN	13307.48	1482.76	492.39	215.95	121.17	56.14	7.36	3.40
	EFF.(%)	58.61	94.12	96.93	97.88	98.18	98.39	98.55	98.57
49.90 min	UP	31921.85	25147.35	16057.39	10231.64	6712.16	3527.01	512.26	241.91
2.71 (psid)	DOWN	8724.22	2103.79	792.65	346.85	194.82	91.37	11.77	5.42
	EFF.(%)	72.67	91.63	95.06	96.61	97.10	97.41	97.70	97.76
59.88 min	UP	31895.25	25049.83	15932.63	10126.34	6627.18	3472.78	504.43	237.88
3.51 (psid)	DOWN	8343.06	2523.53	982.72	433.73	243.36	113.55	15.07	7.02
	EFF.(%)	73.84	89.93	93.83	95.72	96.33	96.73	97.01	97.05
69.86 min	UP	31871.87	25011.71	15906.47	10105.35	6608.13	3463.74	503.20	236.96
4.28 (psid)	DOWN	8944.95	2822.63	1110.64	489.92	274.89	128.24	17.12	7.83
	EFF.(%)	71.93	88.71	93.02	95.15	95.84	96.30	96.60	96.70
79.84 min	UP	31843.45	25043.15	15948.97	10152.79	6651.90	3488.74	506.09	236.78
5.00 (psid)	DOWN	9438.88	3102.15	1229.93	546.85	308.56	144.77	19.48	8.92
	EFF.(%)	70.36	87.61	92.29	94.61	95.36	95.85	96.15	96.23
89.83 min	UP	31867.96	25094.15	16012.34	10201.77	6689.08	3508.93	508.22	238.09
5.56 (psid)	DOWN	9963.43	3359.57	1340.22	595.63	335.44	156.17	20.70	9.51
	EFF.(%)	68.74	86.61	91.63	94.16	94.99	95.55	95.93	96.01

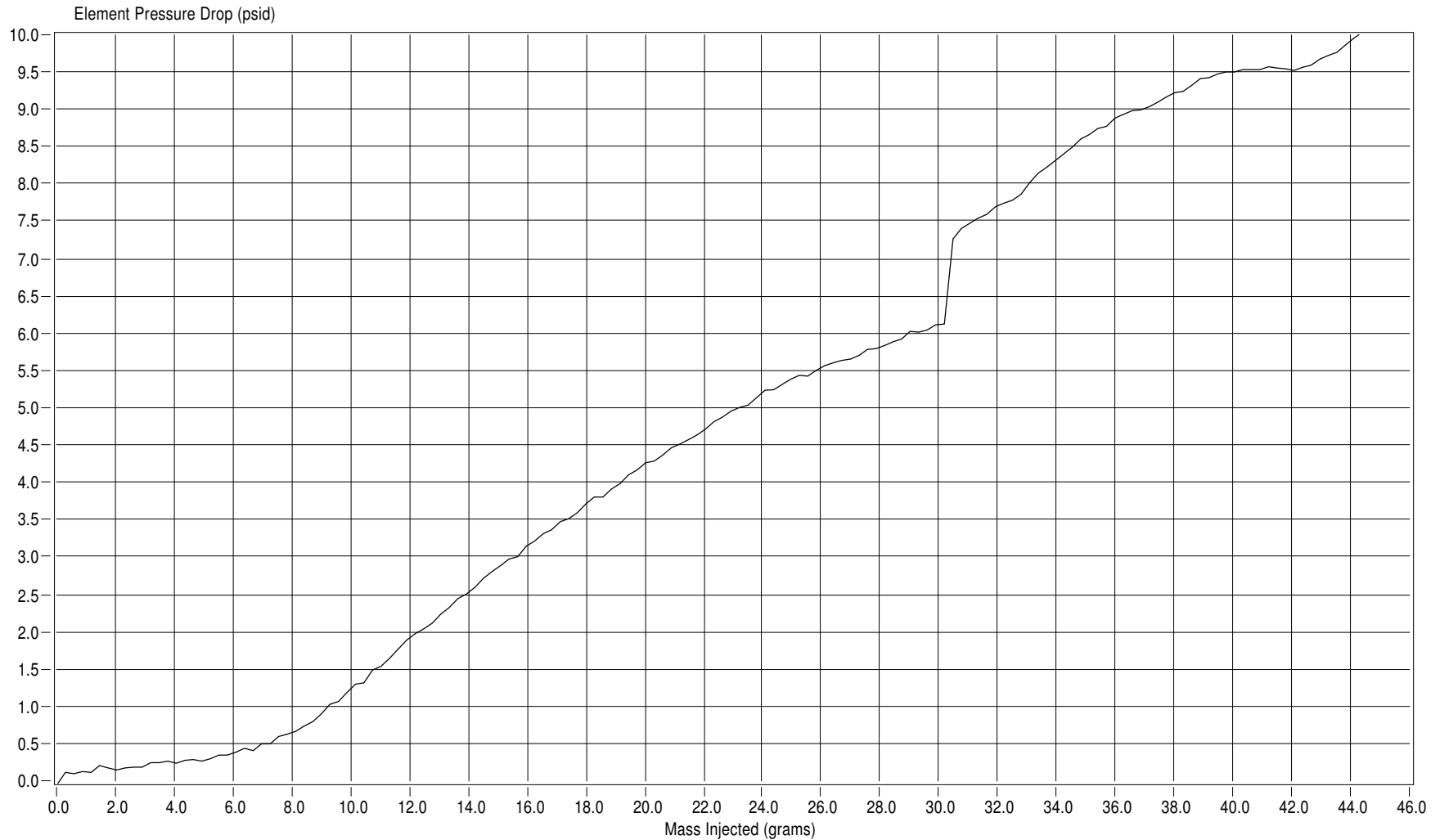
P/N :	1R-0751	TEST No. :	MUL00468
ID :	FL12-1142	TEST DATE :	7/12/12

[illegible]

Differential Pressure Versus Contaminant Added

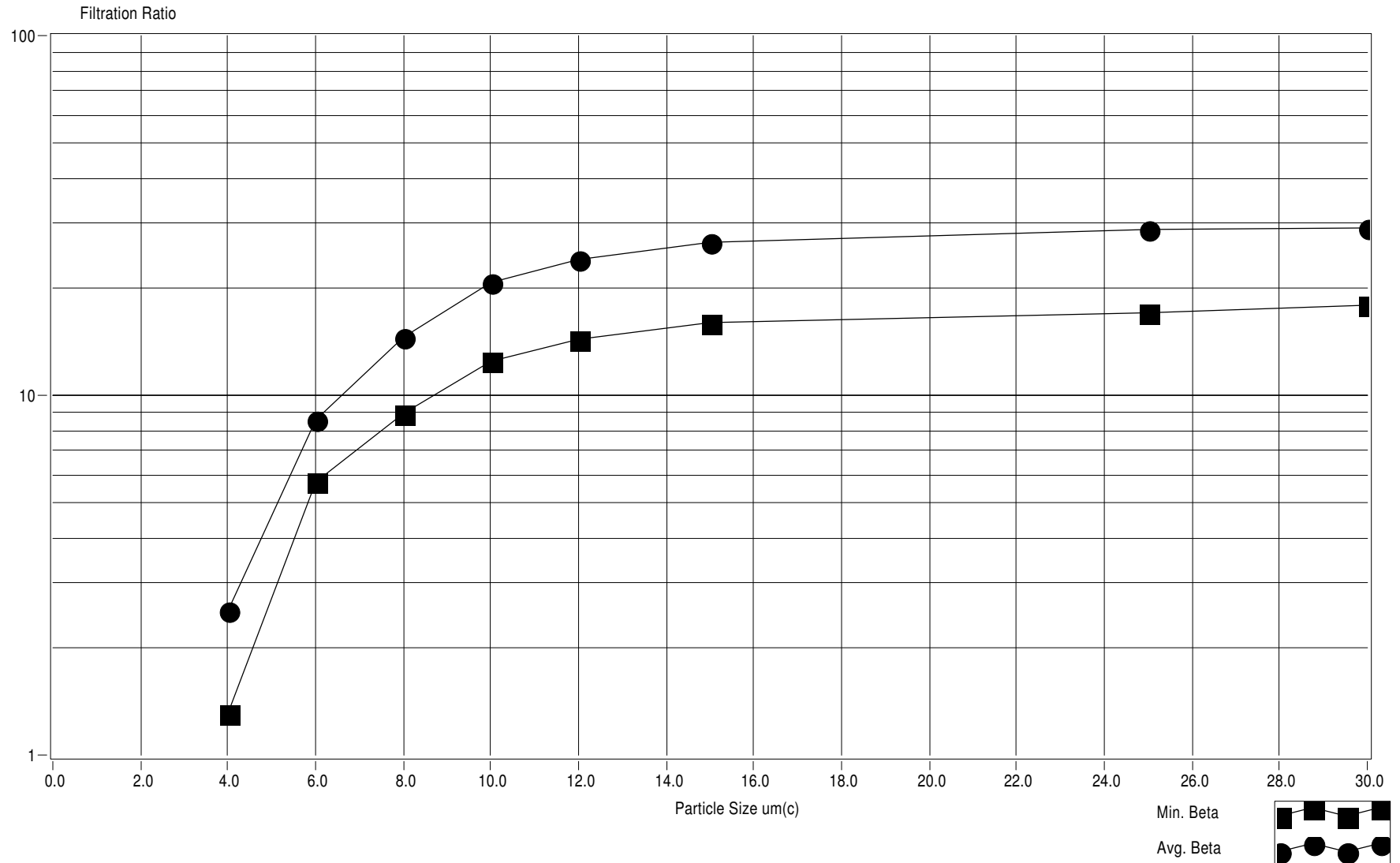
P/N.: 1R-0751
ID: FL12-1142
TERMINAL (psid): 10.00

TEST No.: MUL00468
TEST DATE: 7/12/12
OPERATOR: RVL



Filtration Ratio Versus Particle Size

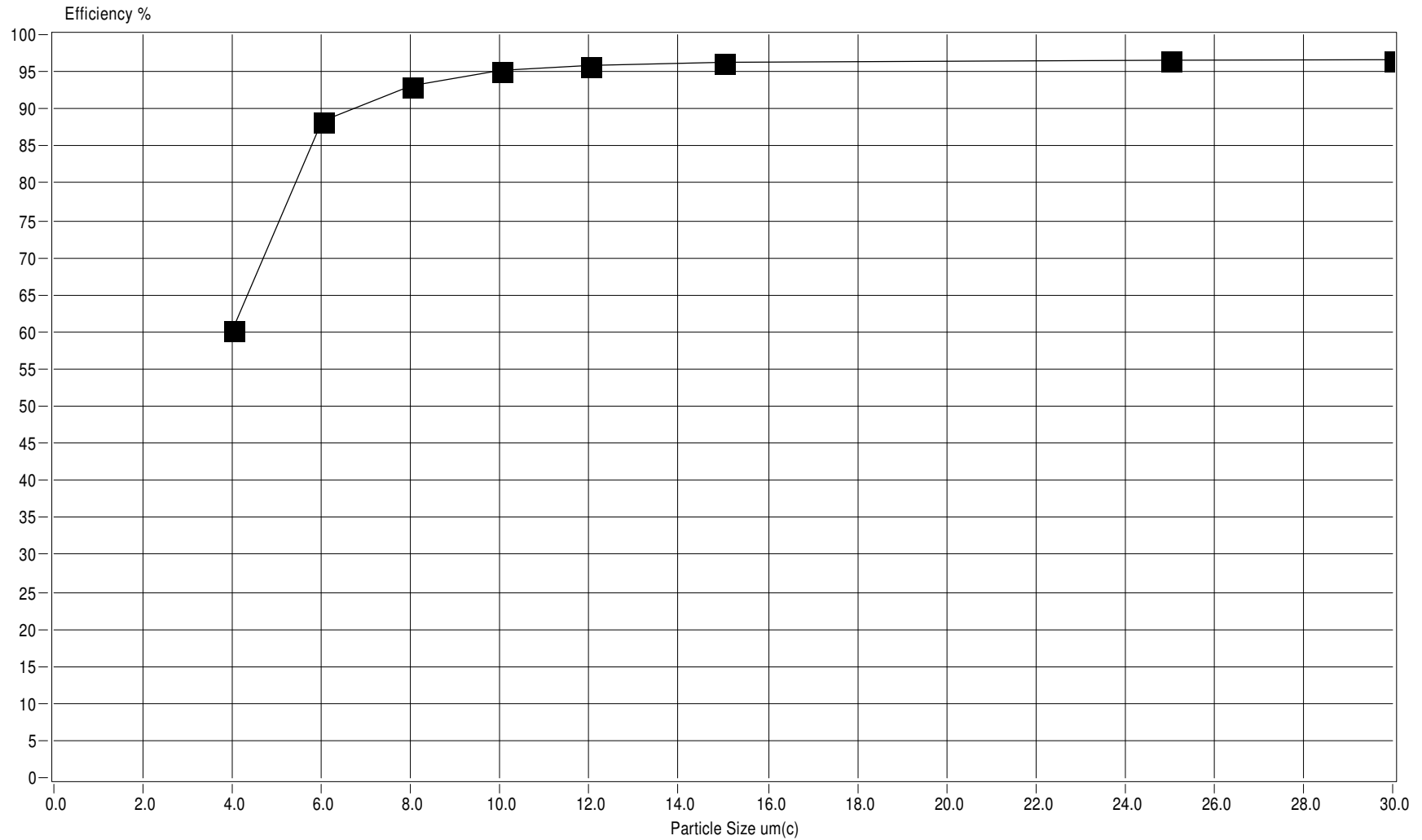
P/N.:	1R-0751	TEST No.:	MUL00468
ID:	FL12-1142	TEST DATE:	7/12/12
TERMINAL (psid):	10.00	OPERATOR:	RVL



Efficiency Versus Particle Size

P/N.: 1R-0751
ID: FL12-1142
TERMINAL (psid): 10.00

TEST No.: MUL00468
TEST DATE: 7/12/12
OPERATOR: RVL



TARDEC MULTI-PASS TEST DATA SHEET

P/N:	1R-0751
ID:	FL12-1142
Test No.:	MUL00468

P/N:	1R-0751
Element ID:	FL12-1142
Test No.:	MUL00468
Test Date:	7/12/12
Operator:	RVL
Manufacture:	CAT
Element Type:	Spin on
General Inf.:	MRAP
Project No.:	WD-17
Company:	ARMY
Test Housing ID:	

Element Area (Sq.Inch)	1.000E+0
Capacity (g/Sq.Inch)	44.37
Flux (gpm/Sq.Inch)	1.50
No. of Pleats:	0.00
Pleat Height (Inch)	0.00
Pleat Length (Inch)	0.00
Filter O.D. (Inch)	0.00

Initial Injection Volume [l]:	81.00
Final Injection Volume [l]:	39.52
Inj. Temperature [oF]:	100.00

Test Fluid Ref:	5606
Batch No.:	4055728
Test Fluid Type:	Shell
Antistatic Type:	Stadis 450
Bubble Point Fluid:	ALCOHOL

Initial System Volume [l]:	11.00
Final System Volume [l]:	11.00
Anti-Static Added [ppm]:	100.00
Temperature [oF]:	100.00
Conductivity [pS/M]:	1500.00
Viscosity[cSt]:	15.00
RH%:	0.00
Flow Rate [gpm]:	1.50
Bubble Point [in. H2O]:	0.00
MIN. BUBBLE POINT [in. H2O]:	0.00

Dust Type:	A-3
Batch No.:	5544Q

Media:	
Layer 1 :	
Layer 2 :	
Layer 3 :	
Layer 4 :	
Layer 5 :	
Layer 6 :	
Layer 7 :	

Test Sys. Cleanliness [particle/ml]:	661.680
Inj. Sys.Cleanliness [particle/ml]:	0.000
Approximate Element Capacity [g] :	0.000
Required Inj. Grav. Level [mg/l] :	1135.620
Contaminant Required [g] :	91.985
Calculated Test Time[min] :	0.000
Sensor Flow [ml/min] :	50.000

TARDEC MULTI-PASS TEST DATA SHEET

P/N:	1R-0751
ID:	FL12-1142
Test No.:	MUL00468

Terminal Pressure [psid]:	10.00
Housing Pressure [psid]:	2.41
Clean Assembly [psid]:	2.22
Clean Filter Media [psid]:	-0.19
Net [psid]:	10.19

Dust Injected [g]:	44.37
Dust Retained [g]:	44.67

Base U.G.L [mg/l]:	51.30
Final U.G.L [mg/L]:	35.00

Initial Inj Grav. [mg/l]:	1068.00
Final Inj Grav. [mg/L]:	1070.00

Initial Inj Flow [lpm]:	0.30
Final Inj Flow [lpm]:	0.25

% Assembly	Time at	Time of Count
D.P.	% of Assembly	at % of
	D.P. [min]	Assembly
		D.P. [min]
2.5%	0.83	0.01
5%	19.44	18.96
10%	30.25	29.94
15%	35.90	34.93
20%	40.97	40.92
30%	51.91	51.90
40%	64.34	63.87
80%	113.21	112.79
100%	152.33	151.72

Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
BCK	2.22	1.00	UP	509.11	10.79	0.50	0.14	0.06	0.06	0.00	0.00	49.66	100.16
0		1.00	DOWN	814.25	3.55	0.12	0.02	0.02	0.00	0.00	0.00	49.81	
			BETA	0.63	3.04	4.17	7.00	3.00	99999.99	99999.99	99999.99		
0.01	2.35	1.00	UP	14550.48	5039.03	2042.17	1026.10	576.41	285.00	48.56	25.56	49.15	99.57
1		1.00	DOWN	5059.40	196.82	20.34	9.66	6.34	4.10	1.49	1.03	49.69	
			BETA	2.88	25.60	100.40	106.22	90.92	69.51	32.59	24.82		
1.00	2.52	1.00	UP	27890.81	15735.37	7588.06	4072.50	2381.79	1162.74	164.89	76.82	51.03	99.26
2		1.00	DOWN	12653.56	795.21	83.71	32.79	19.11	10.00	2.24	1.41	49.77	
			BETA	2.20	19.79	90.65	124.20	124.64	116.27	73.61	54.48		
2.00	2.50	1.00	UP	30906.96	20213.39	10813.68	6161.07	3736.81	1855.80	260.06	122.38	50.06	98.99
3		1.00	DOWN	17007.26	1129.66	111.20	43.17	23.53	11.87	2.07	1.03	49.89	
			BETA	1.82	17.89	97.25	142.72	158.81	156.34	125.63	118.82		
2.99	2.53	1.00	UP	31227.35	22095.02	12584.89	7437.25	4619.26	2341.84	329.60	152.70	49.96	98.78
4		1.00	DOWN	19734.89	1382.25	130.72	47.17	26.15	11.81	1.95	1.07	50.18	
			BETA	1.58	15.98	96.27	157.67	176.64	198.29	169.03	142.71		
4.00	2.52	1.00	UP	31684.22	22481.19	12840.88	7605.97	4745.71	2401.16	339.78	157.71	50.63	98.61
5		1.00	DOWN	20837.41	1419.70	133.15	49.41	27.33	12.94	2.14	1.35	50.50	
			BETA	1.52	15.84	96.44	153.94	173.64	185.56	158.78	116.82		
4.99	2.61	1.00	UP	32064.03	23700.99	14054.84	8511.81	5384.45	2759.70	390.84	180.84	50.43	98.42
6		1.00	DOWN	22280.17	1571.57	147.43	53.23	29.49	13.99	2.16	1.07	49.72	
			BETA	1.44	15.08	95.33	159.91	182.59	197.26	180.94	169.01		
5.99	2.58	1.00	UP	32185.58	24177.62	14618.19	8974.16	5732.31	2943.59	419.69	193.46	49.39	98.28
7		1.00	DOWN	23266.19	1663.08	157.39	57.60	31.94	14.60	2.12	1.19	49.48	
			BETA	1.38	14.54	92.88	155.80	179.47	201.62	197.97	162.57		
6.98	2.55	1.00	UP	32189.37	24623.63	15166.32	9403.37	6068.45	3156.69	457.94	209.87	49.41	98.16
8		1.00	DOWN	24000.40	1732.65	160.64	59.27	31.85	14.76	1.84	0.95	50.17	
			BETA	1.34	14.21	94.41	158.65	190.53	213.87	248.88	220.92		
7.98	2.58	1.00	UP	32561.48	25014.45	15468.19	9648.78	6246.00	3245.24	463.57	216.87	50.24	98.01
9		1.00	DOWN	24539.10	1758.56	166.37	60.85	32.58	14.77	1.98	0.93	50.22	
			BETA	1.33	14.22	92.97	158.57	191.71	219.72	234.13	233.19		
8.98	2.59	1.00	UP	32638.24	25408.55	15916.52	10016.35	6520.38	3419.78	490.03	229.35	51.36	97.92
10		1.00	DOWN	25092.61	1820.71	174.64	65.13	35.06	16.68	2.44	1.23	50.00	
			BETA	1.30	13.96	91.14	153.79	185.98	205.02	200.83	186.46		
9.97	2.59	1.00	UP	32438.81	25170.72	15731.87	9898.46	6439.48	3364.39	490.76	229.20	50.16	97.95
11		1.00	DOWN	25123.94	1789.80	173.04	65.77	35.51	16.71	2.48	1.21	50.35	
			BETA	1.29	14.06	90.91	150.50	181.34	201.34	197.89	189.42		
10.98	2.65	1.00	UP	32765.67	25375.51	15843.83	9950.48	6469.52	3374.75	498.74	232.81	50.03	98.09
12		1.00	DOWN	25054.07	1749.02	174.05	66.44	36.96	17.33	2.16	1.09	50.19	
			BETA	1.31	14.51	91.03	149.77	175.04	194.73	230.90	213.59		
11.97	2.65	1.00	UP	32493.12	25165.79	15691.88	9835.38	6378.56	3346.38	495.48	231.73	50.29	98.21
13		1.00	DOWN	25028.96	1718.57	171.88	66.95	36.17	16.46	2.34	1.15	49.86	
			BETA	1.30	14.64	91.30	146.91	176.35	203.30	211.74	201.50		
12.97	2.67	1.00	UP	32580.11	25222.01	15724.94	9877.93	6428.46	3359.44	487.58	225.43	50.25	98.31
14		1.00	DOWN	25020.12	1672.45	173.93	66.52	35.75	16.40	2.30	1.21	49.76	
			BETA	1.30	15.08	90.41	148.50	179.82	204.84	211.99	186.31		

P/N: 1R-0751
ID: FL12-1142

Test No.: MUL00468
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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
13.97	2.64	1.00	UP	32555.73	25278.95	15821.11	9967.29	6493.92	3399.24	495.62	231.99	49.83	98.41
15		1.00	DOWN	24928.77	1642.60	178.15	71.31	39.14	17.67	2.58	1.27	49.97	
			BETA	1.31	15.39	88.81	139.77	165.92	192.37	192.10	182.67		
14.97	2.68	1.00	UP	32551.59	25360.22	15950.11	10061.00	6555.35	3430.63	500.07	234.88	49.76	98.52
16		1.00	DOWN	24945.51	1638.94	182.92	74.02	41.12	18.32	2.52	1.19	50.33	
			BETA	1.30	15.47	87.20	135.92	159.42	187.26	198.44	197.38		
15.96	2.69	1.00	UP	32539.17	25434.49	16030.54	10125.89	6616.51	3475.76	502.20	231.44	50.93	98.62
17		1.00	DOWN	24890.99	1593.38	187.07	75.48	41.56	19.17	2.55	1.29	50.23	
			BETA	1.31	15.96	85.69	134.15	159.20	181.31	196.94	179.41		
16.97	2.67	1.00	UP	32464.15	25416.91	16080.34	10195.06	6662.51	3508.54	521.52	243.11	49.94	98.75
18		1.00	DOWN	24753.00	1561.73	189.66	78.36	42.52	18.91	2.36	1.27	50.20	
			BETA	1.31	16.27	84.79	130.11	156.69	185.54	220.98	191.43		
17.96	2.70	1.00	UP	32442.21	25482.88	16184.59	10280.76	6740.15	3536.72	508.38	240.42	49.85	98.86
19		1.00	DOWN	24601.89	1529.29	196.67	80.59	45.53	21.13	2.60	1.29	50.17	
			BETA	1.32	16.66	82.29	127.57	148.04	167.38	195.53	186.37		
18.96	2.75	1.00	UP	32406.56	25238.07	15863.99	10001.63	6535.40	3438.56	496.51	230.59	50.10	98.98
20		1.00	DOWN	24307.81	1436.06	192.17	78.54	43.70	20.28	2.97	1.33	49.97	
			BETA	1.33	17.57	82.55	127.34	149.55	169.55	167.18	173.38		
19.95	2.75	1.00	UP	32387.83	25237.23	15871.40	10009.15	6524.77	3412.49	496.17	232.99	49.88	99.08
21		1.00	DOWN	24094.48	1379.60	193.97	82.71	45.51	21.30	2.91	1.23	50.19	
			BETA	1.34	18.29	81.82	121.01	143.37	160.21	170.51	189.42		
20.96	2.79	1.00	UP	32571.48	25449.83	16098.88	10203.85	6687.15	3522.80	507.36	238.27	50.77	99.21
22		1.00	DOWN	23784.17	1341.06	205.45	87.00	48.09	21.74	3.09	1.65	50.08	
			BETA	1.37	18.98	78.36	117.29	139.05	162.04	164.19	144.41		
21.96	2.84	1.00	UP	32271.13	25295.86	16044.96	10167.43	6652.79	3491.40	506.98	239.42	49.52	99.31
23		1.00	DOWN	23687.51	1334.71	219.23	94.08	53.27	25.13	3.23	1.60	50.63	
			BETA	1.36	18.95	73.19	108.07	124.89	138.93	156.96	149.64		
22.96	2.81	1.00	UP	32443.16	25412.92	16107.16	10222.96	6702.56	3525.10	507.05	239.48	50.08	99.41
24		1.00	DOWN	23756.91	1314.35	234.99	100.24	55.96	25.80	3.32	1.43	50.19	
			BETA	1.37	19.33	68.54	101.98	119.77	136.63	152.73	167.47		
23.95	2.90	1.00	UP	32287.56	25161.24	15846.49	9980.24	6501.47	3394.52	495.03	231.46	50.74	99.54
25		1.00	DOWN	23085.80	1262.78	243.50	103.69	58.67	27.71	3.53	1.75	49.89	
			BETA	1.40	19.93	65.08	96.25	110.81	122.50	140.24	132.26		
24.95	2.90	1.00	UP	32435.75	25328.38	15997.15	10098.31	6583.29	3454.62	499.21	233.60	50.09	99.66
26		1.00	DOWN	22439.62	1241.59	255.96	108.71	61.16	28.35	3.76	1.74	49.91	
			BETA	1.45	20.40	62.50	92.89	107.64	121.86	132.77	134.25		
25.95	3.00	1.00	UP	32285.96	25221.16	15947.03	10103.30	6594.61	3451.85	500.89	235.43	49.84	99.72
27		1.00	DOWN	21560.89	1233.40	268.51	114.60	64.37	30.13	3.75	1.69	49.97	
			BETA	1.50	20.45	59.39	88.16	102.45	114.57	133.57	139.31		
26.94	3.03	1.00	UP	32432.46	25423.83	16143.96	10255.97	6720.87	3537.10	515.48	242.94	50.92	99.82
28		1.00	DOWN	20760.43	1242.01	295.06	128.33	70.65	33.32	4.64	2.34	49.87	
			BETA	1.56	20.47	54.71	79.92	95.13	106.16	111.09	103.82		
27.95	3.07	1.00	UP	32396.05	25454.71	16173.54	10276.40	6736.82	3535.98	504.96	231.83	49.62	99.92
29		1.00	DOWN	19856.18	1254.93	316.23	137.72	78.01	36.86	4.76	2.46	49.97	
			BETA	1.63	20.28	51.14	74.62	86.36	95.93	106.08	94.24		

P/N: 1R-0751
ID: FL12-1142

Test No.: MUL00468
Test Date: 7/12/12

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
28.94	3.14	1.00	UP	32261.92	25522.00	16355.44	10433.61	6861.48	3609.27	524.65	246.74	50.06	100.00
30		1.00	DOWN	19015.61	1284.80	344.56	147.50	83.49	38.56	5.47	2.56	50.08	
			BETA	1.70	19.86	47.47	70.74	82.18	93.60	95.91	96.38		
29.94	3.20	1.00	UP	32333.24	25355.65	16092.91	10216.96	6699.48	3518.70	516.34	240.72	50.33	100.07
31		1.00	DOWN	17719.96	1271.71	358.32	155.49	88.36	40.73	5.57	2.70	49.92	
			BETA	1.82	19.94	44.91	65.71	75.82	86.39	92.70	89.16		
30.94	3.30	1.00	UP	32191.79	25178.23	15948.84	10122.10	6632.61	3483.44	507.00	235.95	49.83	100.16
32		1.00	DOWN	16573.29	1285.36	378.44	163.31	92.16	42.59	5.71	2.44	50.09	
			BETA	1.94	19.59	42.14	61.98	71.97	81.79	88.79	96.70		
31.93	3.43	1.00	UP	32214.01	25268.71	16024.55	10165.29	6637.13	3485.96	505.74	235.18	49.78	100.21
33		1.00	DOWN	15525.84	1331.64	411.85	180.21	98.96	45.67	6.28	3.11	50.09	
			BETA	2.07	18.98	38.91	56.41	67.07	76.33	80.53	75.62		
32.94	3.47	1.00	UP	32226.60	25349.20	16127.05	10249.54	6718.78	3530.25	509.95	239.84	49.94	100.27
34		1.00	DOWN	14539.48	1399.79	450.43	196.81	110.88	50.35	7.13	3.49	49.93	
			BETA	2.22	18.11	35.80	52.08	60.60	70.11	71.52	68.72		
33.93	3.59	1.00	UP	32162.30	25149.41	15892.81	10051.36	6564.88	3431.63	492.84	235.10	49.79	100.39
35		1.00	DOWN	13306.80	1419.00	464.03	202.83	114.92	52.12	6.28	2.76	50.08	
			BETA	2.42	17.72	34.25	49.56	57.13	65.84	78.48	85.18		
34.93	3.70	1.00	UP	32191.50	25239.56	16038.34	10174.30	6652.51	3495.77	516.60	244.31	49.56	100.42
36		1.00	DOWN	12494.67	1503.22	509.03	222.54	125.17	58.83	7.81	3.63	49.86	
			BETA	2.58	16.79	31.51	45.72	53.15	59.42	66.15	67.30		
35.92	3.72	1.00	UP	32116.28	25186.88	15987.93	10154.05	6637.85	3485.90	501.75	231.87	49.51	100.51
37		1.00	DOWN	11664.00	1552.68	537.84	237.92	132.23	61.01	7.83	3.63	50.06	
			BETA	2.75	16.22	29.73	42.68	50.20	57.14	64.08	63.88		
36.93	3.89	1.00	UP	32105.99	25208.07	16034.07	10179.86	6656.67	3488.63	508.38	240.22	50.07	100.58
38		1.00	DOWN	10995.63	1624.55	575.40	251.04	142.41	66.67	8.64	4.04	49.97	
			BETA	2.92	15.52	27.87	40.55	46.74	52.33	58.84	59.46		
37.92	3.94	1.00	UP	32064.99	25248.52	16108.84	10262.56	6734.24	3545.85	509.83	240.79	49.95	100.65
39		1.00	DOWN	10408.34	1703.35	609.81	271.36	152.80	70.72	9.02	4.28	50.08	
			BETA	3.08	14.82	26.42	37.82	44.07	50.14	56.52	56.26		
38.93	4.05	1.00	UP	31940.59	25061.58	15920.36	10120.01	6616.09	3466.93	499.20	234.52	49.96	100.71
40		1.00	DOWN	9846.77	1736.29	628.75	278.02	153.84	72.69	9.31	3.94	49.92	
			BETA	3.24	14.43	25.32	36.40	43.01	47.69	53.62	59.52		
39.92	4.17	1.00	UP	31955.69	25048.06	15912.70	10108.45	6613.34	3473.26	511.95	242.37	49.01	100.82
41		1.00	DOWN	9395.77	1803.19	659.53	287.55	160.90	76.01	9.19	4.15	50.16	
			BETA	3.40	13.89	24.13	35.15	41.10	45.69	55.71	58.40		
40.92	4.29	1.00	UP	32002.63	25266.73	16155.70	10303.49	6764.88	3559.23	520.51	242.50	49.93	100.88
42		1.00	DOWN	9242.74	1913.84	701.02	307.50	171.89	81.13	9.98	3.90	50.15	
			BETA	3.46	13.20	23.05	33.51	39.36	43.87	52.16	62.18		
41.92	4.38	1.00	UP	31898.73	25073.68	15981.82	10184.71	6682.67	3512.84	507.21	241.25	49.80	100.98
43		1.00	DOWN	8926.00	1952.81	724.06	319.94	180.60	83.88	10.85	5.03	50.93	
			BETA	3.57	12.84	22.07	31.83	37.00	41.88	46.75	47.96		
42.91	4.44	1.00	UP	31919.00	25121.34	16035.09	10194.32	6678.66	3503.05	504.82	238.94	50.10	101.06
44		1.00	DOWN	8762.17	2033.84	764.22	332.88	186.81	87.38	11.45	5.32	49.87	
			BETA	3.64	12.35	20.98	30.62	35.75	40.09	44.09	44.91		

P/N:	1R-0751	Test No.:	MUL00468	Page #	5
ID:	FL12-1142	Test Date:	7/12/12		

Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
43.92	4.52	1.00	UP	31869.48	25105.41	16029.41	10216.09	6701.46	3519.19	505.40	237.82	49.75	101.12
45		1.00	DOWN	8613.69	2091.00	784.72	343.55	192.48	90.13	11.00	5.15	50.03	
			BETA	3.70	12.01	20.43	29.74	34.82	39.05	45.95	46.18		
44.92	4.64	1.00	UP	31904.60	25145.29	16075.74	10257.38	6743.23	3532.46	518.68	247.72	50.34	101.22
46		1.00	DOWN	8545.01	2148.33	812.22	355.82	200.48	93.70	12.04	5.54	50.01	
			BETA	3.73	11.70	19.79	28.83	33.64	37.70	43.08	44.71		
45.91	4.73	1.00	UP	31940.55	25264.54	16191.19	10353.86	6798.23	3568.62	519.85	241.79	49.87	101.15
47		1.00	DOWN	8569.31	2222.37	845.45	370.51	206.62	98.65	13.51	6.20	50.00	
			BETA	3.73	11.37	19.15	27.94	32.90	36.17	38.48	39.00		
46.91	4.85	1.00	UP	31870.75	25173.71	16133.71	10298.88	6770.08	3566.51	509.80	239.99	50.44	101.07
48		1.00	DOWN	8509.43	2271.36	866.31	377.56	213.62	100.10	13.26	6.51	50.30	
			BETA	3.75	11.08	18.62	27.28	31.69	35.63	38.45	36.86		
47.90	4.91	1.00	UP	31973.80	25179.50	16072.48	10228.99	6708.64	3536.03	512.81	243.64	49.77	100.96
49		1.00	DOWN	8347.00	2283.76	875.18	382.38	216.11	102.00	13.15	5.99	50.08	
			BETA	3.83	11.03	18.36	26.75	31.04	34.67	39.00	40.67		
48.91	5.00	1.00	UP	31883.30	25095.21	15986.06	10170.24	6660.42	3498.96	511.52	243.10	49.91	100.87
50		1.00	DOWN	8331.12	2317.43	893.74	390.76	218.64	100.71	13.25	6.37	49.91	
			BETA	3.83	10.83	17.89	26.03	30.46	34.74	38.61	38.16		
49.90	5.12	1.00	UP	31919.49	25096.72	16010.38	10193.43	6667.44	3488.51	504.13	238.98	49.64	100.77
51		1.00	DOWN	8320.61	2367.61	910.05	402.14	227.70	104.57	13.04	6.16	50.39	
			BETA	3.84	10.60	17.59	25.35	29.28	33.36	38.66	38.80		
50.90	5.21	1.00	UP	31890.51	25032.09	15934.30	10140.20	6645.93	3499.86	516.49	242.75	50.16	100.68
52		1.00	DOWN	8205.51	2385.99	922.07	411.37	232.22	107.94	14.56	7.05	49.78	
			BETA	3.89	10.49	17.28	24.65	28.62	32.42	35.47	34.43		
51.90	5.29	1.00	UP	31849.01	25016.02	15917.73	10110.09	6615.68	3467.99	500.47	235.33	50.19	100.61
53		1.00	DOWN	8288.74	2449.37	949.10	417.56	233.66	109.83	14.56	7.25	49.96	
			BETA	3.84	10.21	16.77	24.21	28.31	31.58	34.37	32.46		
52.90	5.38	1.00	UP	31906.55	24967.32	15824.37	10038.30	6546.72	3417.23	484.26	229.97	49.75	100.46
54		1.00	DOWN	8182.93	2436.64	949.51	419.03	234.91	112.03	15.72	7.19	50.01	
			BETA	3.90	10.25	16.67	23.96	27.87	30.50	30.81	31.98		
53.89	5.41	1.00	UP	31886.35	25015.85	15891.38	10094.70	6604.04	3463.23	506.51	239.56	50.09	100.36
55		1.00	DOWN	8267.83	2498.73	972.16	431.41	240.56	109.41	13.82	6.10	50.38	
			BETA	3.86	10.01	16.35	23.40	27.45	31.65	36.65	39.27		
54.90	5.55	1.00	UP	31940.25	25196.42	16093.99	10256.31	6739.29	3538.99	514.99	240.70	49.97	100.23
56		1.00	DOWN	8451.93	2589.36	1004.43	441.64	246.49	116.47	15.66	6.80	49.43	
			BETA	3.78	9.73	16.02	23.22	27.34	30.39	32.89	35.40		
55.89	5.62	1.00	UP	31938.29	25066.83	15913.71	10101.13	6607.21	3464.72	506.27	241.80	49.98	100.14
57		1.00	DOWN	8361.17	2578.47	1011.53	444.42	249.97	115.79	15.21	7.43	50.12	
			BETA	3.82	9.72	15.73	22.73	26.43	29.92	33.29	32.54		
56.89	5.72	1.00	UP	31876.95	25027.83	15897.40	10096.59	6606.23	3446.47	499.10	232.92	50.22	100.01
58		1.00	DOWN	8412.50	2610.62	1027.89	453.13	255.41	117.58	14.89	7.20	50.34	
			BETA	3.79	9.59	15.47	22.28	25.87	29.31	33.52	32.35		
57.88	5.77	1.00	UP	31879.62	25042.59	15945.07	10137.66	6635.23	3481.90	508.63	242.91	49.90	99.96
59		1.00	DOWN	8443.95	2648.37	1034.02	455.42	254.41	121.74	16.34	7.14	49.88	
			BETA	3.78	9.46	15.42	22.26	26.08	28.60	31.13	34.02		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
58.89	5.88	1.00	UP	31865.47	25036.63	15897.94	10095.02	6604.06	3458.92	503.42	233.85	49.89	99.84
60		1.00	DOWN	8495.46	2670.16	1046.48	461.22	258.27	120.17	16.90	7.88	50.51	
			BETA	3.75	9.38	15.19	21.89	25.57	28.78	29.79	29.68		
59.88	5.92	1.00	UP	31923.44	24990.52	15858.33	10045.36	6555.92	3433.72	502.45	235.24	49.96	99.75
61		1.00	DOWN	8458.89	2680.18	1049.54	463.19	258.68	119.02	16.85	7.19	49.75	
			BETA	3.77	9.32	15.11	21.69	25.34	28.85	29.82	32.72		
60.89	6.00	1.00	UP	31845.19	25009.66	15890.16	10099.63	6606.20	3470.63	509.71	239.95	50.13	99.68
62		1.00	DOWN	8568.73	2738.41	1072.17	471.01	263.86	123.98	16.47	7.68	49.49	
			BETA	3.72	9.13	14.82	21.44	25.04	27.99	30.95	31.24		
61.88	6.12	1.00	UP	31883.26	25018.52	15900.25	10113.19	6617.24	3477.87	500.54	236.78	49.96	99.53
63		1.00	DOWN	8682.56	2758.42	1081.54	479.44	270.16	125.36	16.82	7.51	49.97	
			BETA	3.67	9.07	14.70	21.09	24.49	27.74	29.76	31.53		
62.88	6.21	1.00	UP	31898.39	25055.13	15925.81	10114.00	6608.82	3470.23	497.26	231.90	49.98	99.40
64		1.00	DOWN	8926.86	2782.82	1092.38	478.70	266.95	126.20	17.29	8.18	49.97	
			BETA	3.57	9.00	14.58	21.13	24.76	27.50	28.76	28.35		
63.87	6.21	1.00	UP	31835.09	24939.69	15827.23	10032.25	6552.70	3414.74	494.74	234.90	49.80	99.29
65		1.00	DOWN	9003.39	2793.13	1100.96	488.14	274.20	127.89	17.35	8.14	49.93	
			BETA	3.54	8.93	14.38	20.55	23.90	26.70	28.52	28.86		
64.88	6.32	1.00	UP	31854.74	24973.34	15869.51	10075.44	6587.39	3444.98	497.30	235.33	49.96	99.14
66		1.00	DOWN	9071.15	2818.80	1110.11	487.64	273.17	128.58	16.68	7.57	49.99	
			BETA	3.51	8.86	14.30	20.66	24.11	26.79	29.81	31.09		
65.87	6.39	1.00	UP	31884.07	25080.72	16013.03	10197.63	6676.23	3502.44	518.30	243.39	50.48	99.10
67		1.00	DOWN	9185.48	2905.02	1150.74	510.33	286.13	132.13	17.82	8.34	50.09	
			BETA	3.47	8.63	13.92	19.98	23.33	26.51	29.09	29.18		
66.87	6.51	1.00	UP	31895.24	25011.65	15904.82	10093.58	6598.70	3451.31	498.66	233.81	50.53	99.02
68		1.00	DOWN	9152.94	2892.56	1139.87	502.21	281.04	131.40	17.06	7.48	49.87	
			BETA	3.48	8.65	13.95	20.10	23.48	26.27	29.23	31.26		
67.87	6.57	1.00	UP	31773.53	24956.87	15901.36	10114.12	6614.16	3477.44	509.76	241.68	49.77	98.94
69		1.00	DOWN	9210.13	2913.51	1148.41	507.00	287.11	134.83	17.95	7.79	49.98	
			BETA	3.45	8.57	13.85	19.95	23.04	25.79	28.40	31.02		
68.87	6.67	1.00	UP	31925.77	25081.04	15974.24	10168.29	6663.90	3494.08	503.23	236.58	50.75	98.86
70		1.00	DOWN	9189.32	2943.49	1160.72	511.58	287.57	133.02	16.93	8.41	49.65	
			BETA	3.47	8.52	13.76	19.88	23.17	26.27	29.72	28.13		
69.86	6.69	1.00	UP	31793.18	25032.23	15957.75	10160.66	6657.34	3489.02	499.32	230.06	49.50	98.86
71		1.00	DOWN	9250.99	3002.52	1188.02	529.42	301.24	141.76	18.83	8.21	50.20	
			BETA	3.44	8.34	13.43	19.19	22.10	24.61	26.52	28.02		
70.87	6.77	1.00	UP	31910.34	25086.29	15971.67	10156.70	6647.10	3491.52	503.97	235.35	49.29	98.85
72		1.00	DOWN	9291.75	3010.29	1190.93	531.73	298.10	137.39	17.58	8.04	49.64	
			BETA	3.43	8.33	13.41	19.10	22.30	25.41	28.67	29.27		
71.86	6.87	1.00	UP	31829.99	25125.06	16057.34	10247.73	6743.07	3552.88	522.06	245.67	50.70	98.73
73		1.00	DOWN	9404.26	3066.67	1214.82	539.35	301.44	142.46	19.21	8.73	50.09	
			BETA	3.38	8.19	13.22	19.00	22.37	24.94	27.18	28.14		
72.86	6.92	1.00	UP	31859.59	25091.49	15989.49	10180.22	6673.84	3500.64	506.49	239.35	50.01	98.66
74		1.00	DOWN	9385.50	3069.79	1222.59	540.40	304.75	140.37	19.49	8.97	49.78	
			BETA	3.39	8.17	13.08	18.84	21.90	24.94	25.99	26.68		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
73.85	6.98	1.00	UP	31847.37	24997.34	15899.67	10115.88	6618.96	3475.65	500.71	234.12	50.20	98.64
75		1.00	DOWN	9413.49	3081.37	1219.83	541.81	305.08	144.22	19.01	9.02	49.98	
			BETA	3.38	8.11	13.03	18.67	21.70	24.10	26.34	25.96		
74.86	7.04	1.00	UP	31786.37	25030.12	15953.24	10146.30	6629.11	3462.56	496.50	234.66	50.03	98.62
76		1.00	DOWN	9486.93	3124.88	1236.42	549.68	310.60	144.64	19.83	8.97	49.96	
			BETA	3.35	8.01	12.90	18.46	21.34	23.94	25.04	26.16		
75.85	7.12	1.00	UP	31958.37	25090.06	15983.25	10180.36	6674.67	3497.34	509.64	239.26	50.70	98.62
77		1.00	DOWN	9430.16	3119.63	1238.38	550.32	309.93	145.97	19.35	9.29	49.96	
			BETA	3.39	8.04	12.91	18.50	21.54	23.96	26.34	25.75		
76.86	7.22	1.00	UP	31860.09	25038.37	15948.32	10164.27	6671.19	3496.51	508.57	234.77	50.40	98.58
78		1.00	DOWN	9555.90	3173.30	1257.24	557.38	314.22	148.83	19.52	9.02	49.97	
			BETA	3.33	7.89	12.69	18.24	21.23	23.49	26.05	26.03		
77.85	7.28	1.00	UP	31720.23	24868.93	15760.65	10003.70	6531.54	3428.43	503.23	235.91	50.82	98.57
79		1.00	DOWN	9524.20	3160.29	1252.30	554.44	315.13	147.18	20.33	8.82	49.97	
			BETA	3.33	7.87	12.59	18.04	20.73	23.29	24.75	26.75		
78.85	7.36	1.00	UP	31869.00	25071.59	15968.35	10172.10	6672.14	3492.85	510.45	238.63	50.13	98.58
80		1.00	DOWN	9645.65	3212.72	1278.77	574.01	325.08	154.86	21.62	10.09	50.04	
			BETA	3.30	7.80	12.49	17.72	20.52	22.55	23.61	23.65		
79.84	7.41	1.00	UP	31909.70	25140.85	16057.42	10225.61	6699.73	3504.43	512.62	239.29	49.00	98.57
81		1.00	DOWN	9711.39	3259.02	1300.07	578.72	325.03	152.66	20.51	9.72	50.07	
			BETA	3.29	7.71	12.35	17.67	20.61	22.96	24.99	24.62		
80.85	7.44	1.00	UP	31835.53	25093.10	16028.19	10216.69	6696.59	3512.95	506.19	236.23	50.28	98.57
82		1.00	DOWN	9738.42	3281.56	1308.87	582.27	325.48	149.87	20.47	9.54	49.78	
			BETA	3.27	7.65	12.25	17.55	20.57	23.44	24.73	24.76		
81.84	7.54	1.00	UP	31894.62	25080.21	16000.94	10198.75	6696.35	3525.12	511.21	240.67	50.20	98.58
83		1.00	DOWN	9825.64	3306.54	1315.43	582.84	326.97	151.81	19.36	8.39	49.91	
			BETA	3.25	7.59	12.16	17.50	20.48	23.22	26.41	28.69		
82.84	7.64	1.00	UP	31871.57	25175.35	16116.48	10288.82	6748.67	3547.96	518.55	240.32	49.99	98.58
84		1.00	DOWN	9900.35	3347.84	1328.40	589.16	332.29	153.10	19.02	8.41	49.85	
			BETA	3.22	7.52	12.13	17.46	20.31	23.17	27.26	28.58		
83.84	7.65	1.00	UP	31839.78	25043.72	15970.45	10177.75	6673.65	3510.89	511.49	242.53	49.99	98.61
85		1.00	DOWN	9871.34	3340.76	1334.97	593.27	332.25	154.90	22.22	10.43	49.86	
			BETA	3.23	7.50	11.96	17.16	20.09	22.67	23.02	23.25		
84.84	7.72	1.00	UP	31832.44	25001.27	15916.11	10132.18	6635.78	3479.04	506.87	239.03	50.03	98.63
86		1.00	DOWN	9915.03	3371.79	1347.90	595.89	336.17	158.29	20.76	9.89	50.07	
			BETA	3.21	7.41	11.81	17.00	19.74	21.98	24.42	24.17		
85.83	7.79	1.00	UP	31895.28	25122.83	16041.71	10232.32	6710.08	3521.94	506.77	236.56	50.29	98.64
87		1.00	DOWN	10051.88	3404.31	1350.98	601.51	339.65	159.15	20.85	9.10	50.00	
			BETA	3.17	7.38	11.87	17.01	19.76	22.13	24.31	26.00		
86.84	7.84	1.00	UP	31892.19	25150.86	16058.20	10235.66	6727.63	3525.70	505.89	236.41	50.24	98.72
88		1.00	DOWN	10133.71	3423.62	1367.15	605.31	341.74	159.45	22.68	10.34	50.08	
			BETA	3.15	7.35	11.75	16.91	19.69	22.11	22.31	22.86		
87.83	7.83	1.00	UP	31851.83	25037.89	15928.05	10115.83	6625.51	3459.61	495.85	231.60	50.15	98.94
89		1.00	DOWN	10181.38	3397.34	1359.37	605.36	342.68	158.15	20.69	9.77	49.67	
			BETA	3.13	7.37	11.72	16.71	19.33	21.88	23.97	23.71		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
88.83	7.91	1.00	UP	31856.71	25095.39	16005.89	10194.09	6676.84	3501.63	506.78	238.29	50.39	99.13
90		1.00	DOWN	10305.13	3462.92	1389.04	621.98	352.17	164.34	20.42	9.52	50.16	
			BETA	3.09	7.25	11.52	16.39	18.96	21.31	24.82	25.03		
89.83	7.97	1.00	UP	31837.00	25101.64	16045.33	10236.21	6711.59	3513.65	502.25	233.82	50.05	99.30
91		1.00	DOWN	10337.39	3483.38	1389.87	622.57	348.33	163.29	21.01	9.23	49.86	
			BETA	3.08	7.21	11.54	16.44	19.27	21.52	23.91	25.33		
90.83	8.01	1.00	UP	31851.22	25169.94	16153.44	10310.44	6776.63	3558.11	509.40	239.14	50.41	99.52
92		1.00	DOWN	10442.28	3535.72	1425.07	634.91	359.05	166.96	21.17	9.25	50.19	
			BETA	3.05	7.12	11.34	16.24	18.87	21.31	24.06	25.85		
91.82	8.04	1.00	UP	31897.57	25241.31	16188.55	10328.07	6791.94	3566.79	510.56	236.54	50.53	99.70
93		1.00	DOWN	10444.42	3594.22	1439.51	643.90	357.75	167.84	21.83	10.01	49.49	
			BETA	3.05	7.02	11.25	16.04	18.99	21.25	23.39	23.63		
92.83	8.06	1.00	UP	31853.02	25166.01	16103.11	10300.60	6756.79	3554.93	514.95	241.64	50.00	99.84
94		1.00	DOWN	10405.20	3569.83	1429.34	635.13	359.98	168.47	22.83	10.24	50.39	
			BETA	3.06	7.05	11.27	16.22	18.77	21.10	22.56	23.60		
93.82	8.11	1.00	UP	31894.42	25280.68	16236.25	10405.24	6849.80	3604.12	521.30	244.58	50.17	100.01
95		1.00	DOWN	10601.70	3676.11	1473.01	662.53	373.25	175.59	23.26	10.94	50.19	
			BETA	3.01	6.88	11.02	15.71	18.35	20.53	22.41	22.36		
94.82	8.19	1.00	UP	31814.64	25168.77	16155.81	10338.89	6788.35	3571.05	519.70	243.43	50.24	100.19
96		1.00	DOWN	10535.72	3680.21	1482.06	662.47	372.60	174.93	23.94	10.79	49.97	
			BETA	3.02	6.84	10.90	15.61	18.22	20.41	21.71	22.56		
95.81	8.20	1.00	UP	31806.46	25200.92	16224.78	10402.97	6852.29	3592.03	517.64	244.39	50.11	100.31
97		1.00	DOWN	10574.73	3705.95	1491.03	657.66	370.98	171.96	22.59	10.49	50.16	
			BETA	3.01	6.80	10.88	15.82	18.47	20.89	22.91	23.30		
96.82	8.24	1.00	UP	31921.23	25334.80	16336.62	10480.78	6909.64	3636.19	530.03	248.26	49.94	100.45
98		1.00	DOWN	10675.24	3767.68	1517.94	675.81	382.83	180.81	24.26	11.96	49.79	
			BETA	2.99	6.72	10.76	15.51	18.05	20.11	21.85	20.76		
97.82	8.29	1.00	UP	31802.23	25273.58	16349.88	10510.35	6938.17	3662.24	534.93	249.41	50.06	100.59
99		1.00	DOWN	10797.34	3812.63	1532.37	685.66	384.85	179.43	23.60	10.93	50.13	
			BETA	2.95	6.63	10.67	15.33	18.03	20.41	22.67	22.82		
98.81	8.33	1.00	UP	31852.51	25293.80	16306.09	10453.49	6882.98	3622.48	521.52	245.16	50.08	100.68
100		1.00	DOWN	10776.37	3819.27	1544.99	693.08	389.41	184.03	25.04	11.79	49.86	
			BETA	2.96	6.62	10.55	15.08	17.68	19.68	20.83	20.79		
99.81	8.43	1.00	UP	31858.57	25302.71	16312.14	10456.29	6890.78	3616.72	519.34	243.62	51.53	100.81
101		1.00	DOWN	10780.59	3821.21	1534.17	688.54	388.24	183.73	24.22	11.15	50.46	
			BETA	2.96	6.62	10.63	15.19	17.75	19.68	21.44	21.85		
100.81	8.42	1.00	UP	31948.08	25421.22	16454.73	10587.85	6976.22	3685.81	534.96	253.92	50.04	100.91
102		1.00	DOWN	10917.19	3897.38	1573.26	705.90	400.20	189.10	24.10	11.74	50.18	
			BETA	2.93	6.52	10.46	15.00	17.43	19.49	22.20	21.63		
101.80	8.45	1.00	UP	31774.26	25208.13	16236.02	10424.71	6870.89	3615.15	526.14	247.67	50.68	101.04
103		1.00	DOWN	10823.55	3847.66	1554.67	694.91	390.54	182.99	23.99	11.08	49.93	
			BETA	2.94	6.55	10.44	15.00	17.59	19.76	21.93	22.35		
102.81	8.52	1.00	UP	31797.30	25174.57	16192.45	10368.95	6828.94	3585.52	518.39	245.70	50.39	101.08
104		1.00	DOWN	10792.16	3846.86	1551.31	695.43	390.27	183.64	25.15	11.38	50.15	
			BETA	2.95	6.54	10.44	14.91	17.50	19.52	20.61	21.59		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
103.80	8.53	1.00	UP	31773.87	25148.58	16135.40	10332.91	6794.83	3574.69	527.79	245.83	50.77	101.49
105		1.00	DOWN	11808.52	3845.83	1525.00	682.94	388.21	184.55	25.49	10.98	49.74	
			BETA	2.69	6.54	10.58	15.13	17.50	19.37	20.71	22.39		
104.81	9.67	1.00	UP	31933.73	25024.82	15874.79	10091.07	6609.75	3464.34	508.00	236.56	50.77	101.82
106		1.00	DOWN	11702.58	3669.10	1436.22	639.24	361.49	169.88	21.90	10.13	49.98	
			BETA	2.73	6.82	11.05	15.79	18.28	20.39	23.20	23.35		
105.80	9.81	1.00	UP	31556.89	24422.07	15300.06	9629.95	6256.04	3261.11	466.73	218.54	49.32	102.09
107		1.00	DOWN	10634.24	3530.59	1404.37	629.19	355.63	169.55	24.58	11.28	49.97	
			BETA	2.97	6.92	10.89	15.31	17.59	19.23	18.99	19.37		
106.79	9.88	1.00	UP	31513.23	24225.88	15072.59	9444.72	6127.47	3187.14	468.70	221.37	50.70	102.25
108		1.00	DOWN	10233.37	3454.26	1373.50	611.59	340.97	157.54	21.13	9.39	50.04	
			BETA	3.08	7.01	10.97	15.44	17.97	20.23	22.18	23.58		
107.80	9.95	1.00	UP	31645.79	24338.11	15149.88	9493.24	6137.77	3187.27	462.65	217.74	50.29	102.40
109		1.00	DOWN	10195.67	3517.91	1417.16	635.85	357.36	167.43	23.29	10.69	50.91	
			BETA	3.10	6.92	10.69	14.93	17.18	19.04	19.86	20.37		
108.79	10.00	1.00	UP	31542.72	24280.23	15127.02	9469.06	6143.08	3187.32	469.58	221.01	50.00	102.39
110		1.00	DOWN	10347.91	3614.11	1455.88	658.01	373.25	174.81	25.24	12.70	50.08	
			BETA	3.05	6.72	10.39	14.39	16.46	18.23	18.60	17.40		
109.80	10.10	1.00	UP	31653.84	24460.27	15289.10	9595.46	6229.78	3239.19	469.97	219.68	49.81	102.10
111		1.00	DOWN	10419.13	3692.94	1508.35	683.36	391.68	186.37	26.65	12.60	50.19	
			BETA	3.04	6.62	10.14	14.04	15.91	17.38	17.63	17.43		
110.79	10.15	1.00	UP	31602.83	24408.01	15265.95	9577.26	6194.20	3218.07	464.09	221.68	50.00	101.80
112		1.00	DOWN	10523.98	3754.86	1549.85	702.10	399.81	186.64	26.15	12.77	49.65	
			BETA	3.00	6.50	9.85	13.64	15.49	17.24	17.75	17.36		
111.79	10.19	1.00	UP	31462.36	24019.44	14835.73	9232.02	5942.48	3064.48	446.15	208.87	49.82	101.46
113		1.00	DOWN	10319.24	3690.83	1505.52	674.81	379.71	180.40	26.38	12.73	49.96	
			BETA	3.05	6.51	9.85	13.68	15.65	16.99	16.91	16.41		
112.79	10.27	1.00	UP	31518.38	24093.40	14884.02	9261.67	5970.97	3086.22	440.30	204.56	49.99	101.12
114		1.00	DOWN	10134.11	3552.43	1422.81	642.08	363.90	173.25	23.31	11.22	50.08	
			BETA	3.11	6.78	10.46	14.42	16.41	17.81	18.89	18.23		
113.78	10.42	1.00	UP	31453.69	23942.77	14757.58	9166.07	5889.02	3047.18	438.71	209.44	49.53	100.81
115		1.00	DOWN	10119.05	3508.95	1406.75	626.84	351.50	166.53	21.69	10.73	49.98	
			BETA	3.11	6.82	10.49	14.62	16.75	18.30	20.23	19.52		
114.79	10.55	1.00	UP	31594.55	24148.66	14927.66	9296.72	6004.41	3113.92	455.18	213.21	50.34	100.48
116		1.00	DOWN	10151.97	3555.06	1427.21	641.75	360.88	170.73	21.48	9.39	50.00	
			BETA	3.11	6.79	10.46	14.49	16.64	18.24	21.19	22.71		
115.78	10.63	1.00	UP	31547.04	24271.42	15113.55	9478.19	6140.82	3198.95	469.70	223.77	50.15	100.19
117		1.00	DOWN	10424.89	3679.53	1488.73	664.26	373.37	176.74	23.41	11.78	50.19	
			BETA	3.03	6.60	10.15	14.27	16.45	18.10	20.06	19.00		
116.78	10.72	1.00	UP	31536.03	24145.45	14917.83	9288.59	5998.75	3095.79	452.88	212.15	49.84	99.93
118		1.00	DOWN	10370.09	3601.74	1444.31	642.08	360.46	168.01	21.98	10.14	50.08	
			BETA	3.04	6.70	10.33	14.47	16.64	18.43	20.60	20.92		
117.77	10.81	1.00	UP	31427.29	23775.29	14559.64	9020.53	5799.97	2999.31	437.56	209.70	50.75	99.73
119		1.00	DOWN	10196.02	3489.76	1396.73	623.83	352.58	161.27	21.58	10.31	50.59	
			BETA	3.08	6.81	10.42	14.46	16.45	18.60	20.28	20.34		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
118.78	10.90	1.00	UP	31351.62	23512.38	14249.24	8762.15	5599.28	2869.58	416.18	196.30	49.86	99.52
120		1.00	DOWN	10023.81	3431.88	1372.47	608.75	343.75	163.74	22.42	10.84	49.96	
			BETA	3.13	6.85	10.38	14.39	16.29	17.53	18.56	18.11		
119.77	11.01	1.00	UP	31604.73	24117.35	14865.30	9239.95	5949.41	3065.63	441.18	209.97	49.99	99.34
121		1.00	DOWN	10569.16	3652.99	1466.50	656.29	370.29	175.79	23.74	11.04	49.95	
			BETA	2.99	6.60	10.14	14.08	16.07	17.44	18.58	19.02		
120.78	11.07	1.00	UP	31578.69	24193.90	14962.45	9326.24	6022.45	3133.14	458.19	214.73	49.94	99.22
122		1.00	DOWN	10649.75	3674.10	1471.68	656.92	370.68	175.88	23.31	11.20	50.08	
			BETA	2.97	6.58	10.17	14.20	16.25	17.81	19.66	19.17		
121.77	11.15	1.00	UP	31649.15	24318.71	15105.28	9441.13	6101.51	3162.47	459.91	218.08	49.94	99.10
123		1.00	DOWN	10760.29	3725.52	1500.49	673.16	378.32	176.08	23.79	10.84	50.04	
			BETA	2.94	6.53	10.07	14.03	16.13	17.96	19.33	20.12		
122.77	11.18	1.00	UP	31646.65	24332.98	15126.33	9476.30	6134.40	3190.79	468.97	223.19	50.05	99.05
124		1.00	DOWN	10821.10	3740.53	1501.83	672.02	380.85	179.66	23.19	10.82	49.86	
			BETA	2.92	6.51	10.07	14.10	16.11	17.76	20.22	20.63		
123.77	11.29	1.00	UP	31654.57	24335.36	15140.06	9477.04	6135.15	3184.38	463.10	218.97	50.21	98.96
125		1.00	DOWN	10814.61	3733.69	1500.82	675.11	382.20	180.23	23.62	11.38	49.98	
			BETA	2.93	6.52	10.09	14.04	16.05	17.67	19.61	19.24		
124.76	11.34	1.00	UP	31492.88	24061.36	14858.67	9258.83	5969.74	3089.59	445.83	209.89	50.03	98.89
126		1.00	DOWN	10662.68	3681.59	1475.61	657.66	370.16	176.01	23.79	10.67	50.45	
			BETA	2.95	6.54	10.07	14.08	16.13	17.55	18.74	19.67		
125.77	11.39	1.00	UP	31490.32	23944.46	14718.95	9131.76	5878.83	3040.11	439.17	208.29	50.12	98.87
127		1.00	DOWN	10505.30	3643.32	1459.87	653.48	369.76	172.64	23.77	11.09	49.97	
			BETA	3.00	6.57	10.08	13.97	15.90	17.61	18.48	18.78		
126.76	11.40	1.00	UP	31517.52	23968.96	14732.78	9149.76	5900.94	3050.42	441.53	206.72	49.73	98.83
128		1.00	DOWN	10628.79	3700.49	1491.59	660.87	375.70	174.50	23.38	11.03	49.86	
			BETA	2.97	6.48	9.88	13.85	15.71	17.48	18.88	18.74		
127.76	11.44	1.00	UP	31453.60	23990.32	14773.72	9191.88	5915.26	3055.59	446.84	213.57	49.79	98.77
129		1.00	DOWN	10713.71	3729.32	1496.89	664.96	374.33	174.94	23.26	10.93	50.08	
			BETA	2.94	6.43	9.87	13.82	15.80	17.47	19.21	19.54		
128.75	11.50	1.00	UP	31688.72	24287.96	15046.14	9380.91	6059.07	3138.90	451.03	210.15	49.98	98.68
130		1.00	DOWN	10944.27	3815.65	1532.19	680.14	383.65	180.82	24.44	11.38	49.70	
			BETA	2.90	6.37	9.82	13.79	15.79	17.36	18.45	18.47		
129.76	11.57	1.00	UP	31653.33	24418.70	15222.45	9547.40	6176.11	3224.79	467.94	220.34	50.19	98.63
131		1.00	DOWN	11141.25	3895.50	1570.54	696.50	393.75	183.55	23.70	11.80	49.89	
			BETA	2.84	6.27	9.69	13.71	15.69	17.57	19.74	18.67		
130.76	11.63	1.00	UP	31854.13	24610.35	15387.39	9652.57	6267.64	3256.03	469.17	222.35	48.80	98.64
132		1.00	DOWN	11284.83	3948.41	1596.43	712.70	403.82	188.77	26.02	11.92	50.15	
			BETA	2.82	6.23	9.64	13.54	15.52	17.25	18.03	18.65		
131.75	11.65	1.00	UP	31694.08	24494.28	15310.78	9594.67	6220.99	3241.51	471.92	221.95	51.29	98.64
133		1.00	DOWN	11294.63	3977.52	1596.73	712.78	399.69	184.86	24.39	11.65	49.96	
			BETA	2.81	6.16	9.59	13.46	15.56	17.53	19.35	19.05		
132.74	11.73	1.00	UP	31816.85	24527.42	15280.32	9577.08	6205.68	3233.25	473.95	222.10	49.66	98.66
134		1.00	DOWN	11277.28	3964.87	1606.40	722.98	411.80	191.20	24.90	11.71	49.95	
			BETA	2.82	6.19	9.51	13.25	15.07	16.91	19.03	18.97		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
133.75	11.82	1.00	UP	31636.20	24350.62	15123.76	9455.07	6098.97	3176.44	460.39	218.58	49.69	98.71
135		1.00	DOWN	11229.17	3935.87	1586.26	705.71	396.75	184.04	24.73	11.67	50.35	
			BETA	2.82	6.19	9.53	13.40	15.37	17.26	18.62	18.73		
134.74	11.83	1.00	UP	31705.38	24357.63	15123.85	9435.08	6096.67	3170.60	463.44	217.29	49.70	98.91
136		1.00	DOWN	11257.44	3959.13	1598.00	717.90	404.75	187.45	25.09	11.77	49.98	
			BETA	2.82	6.15	9.46	13.14	15.06	16.91	18.47	18.46		
135.75	11.88	1.00	UP	31619.10	24319.23	15116.82	9457.23	6118.61	3171.05	457.15	214.74	49.95	99.21
137		1.00	DOWN	11435.49	4104.06	1672.71	752.69	419.76	195.01	26.44	11.97	50.16	
			BETA	2.76	5.93	9.04	12.56	14.58	16.26	17.29	17.94		
136.74	11.91	1.00	UP	31694.97	24480.64	15280.15	9595.26	6238.54	3246.18	477.07	223.00	49.81	99.50
138		1.00	DOWN	11546.66	4203.91	1721.76	779.80	444.05	206.59	27.79	13.59	49.98	
			BETA	2.74	5.82	8.87	12.30	14.05	15.71	17.17	16.41		
137.74	11.91	1.00	UP	31765.50	24494.95	15280.49	9603.15	6231.45	3243.47	466.77	219.88	49.68	99.78
139		1.00	DOWN	11368.57	4161.97	1699.23	762.93	428.41	198.04	25.89	11.61	50.06	
			BETA	2.79	5.89	8.99	12.59	14.55	16.38	18.03	18.94		
138.73	11.94	1.00	UP	31560.12	24344.78	15185.36	9505.62	6157.56	3207.14	474.35	224.06	50.50	100.13
140		1.00	DOWN	11092.03	3998.16	1607.17	723.42	408.15	195.10	26.68	11.78	50.02	
			BETA	2.85	6.09	9.45	13.14	15.09	16.44	17.78	19.02		
139.74	11.94	1.00	UP	31668.93	24506.66	15326.00	9619.93	6230.43	3240.96	469.40	223.15	50.26	100.44
141		1.00	DOWN	11150.81	4058.56	1648.88	736.87	417.81	194.53	27.06	12.34	49.93	
			BETA	2.84	6.04	9.29	13.06	14.91	16.66	17.35	18.08		
140.73	11.94	1.00	UP	31684.74	24469.18	15308.16	9616.11	6252.50	3246.26	473.22	224.34	50.37	100.82
142		1.00	DOWN	11110.53	4052.21	1633.29	732.41	415.35	193.60	24.67	11.31	50.13	
			BETA	2.85	6.04	9.37	13.13	15.05	16.77	19.18	19.84		
141.74	11.98	1.00	UP	31570.89	24368.22	15185.50	9488.98	6138.93	3185.41	461.93	214.85	50.22	101.14
143		1.00	DOWN	11130.23	4053.96	1634.97	728.13	411.15	191.55	26.33	11.96	49.97	
			BETA	2.84	6.01	9.29	13.03	14.93	16.63	17.54	17.96		
142.73	11.96	1.00	UP	31713.18	24582.45	15449.99	9739.00	6332.27	3304.44	489.02	233.01	49.42	101.50
144		1.00	DOWN	11261.80	4106.74	1656.25	743.51	422.49	199.60	27.22	13.31	49.86	
			BETA	2.82	5.99	9.33	13.10	14.99	16.56	17.97	17.51		
143.73	11.95	1.00	UP	31672.88	24616.58	15496.36	9792.06	6371.85	3318.93	483.81	229.88	50.32	101.82
145		1.00	DOWN	11361.94	4168.75	1688.97	765.31	434.38	205.15	26.97	12.72	50.04	
			BETA	2.79	5.91	9.18	12.79	14.67	16.18	17.94	18.07		
144.74	11.93	1.00	UP	31645.88	24545.89	15435.81	9723.70	6334.37	3298.22	477.04	226.44	50.06	102.16
146		1.00	DOWN	11307.14	4147.43	1678.23	753.45	426.44	200.14	27.01	12.57	50.09	
			BETA	2.80	5.92	9.20	12.91	14.85	16.48	17.66	18.01		
145.73	11.97	1.00	UP	31656.08	24515.15	15359.53	9672.12	6277.68	3265.50	476.61	224.98	49.86	102.39
147		1.00	DOWN	11300.40	4175.42	1702.77	766.92	434.14	202.51	28.03	12.78	49.98	
			BETA	2.80	5.87	9.02	12.61	14.46	16.13	17.00	17.60		
146.73	12.00	1.00	UP	31657.54	24409.02	15242.68	9574.92	6211.64	3232.59	468.15	215.39	49.80	102.22
148		1.00	DOWN	11314.17	4146.59	1679.03	753.09	425.05	199.73	26.23	12.29	49.87	
			BETA	2.80	5.89	9.08	12.71	14.61	16.18	17.85	17.53		
147.72	12.08	1.00	UP	31786.56	24730.10	15572.93	9809.63	6386.03	3327.24	487.22	230.94	50.16	102.12
149		1.00	DOWN	11577.64	4272.95	1730.43	782.33	438.04	204.89	27.68	13.21	49.59	
			BETA	2.75	5.79	9.00	12.54	14.58	16.24	17.60	17.48		

P/N: 1R-0751
ID: FL12-1142

Test No.: MUL00468
Test Date: 7/12/12

Page # 12

Particle Counts

[illegible]

P/N:	1R-0751	Test No.:	MUL00468	Page # 13
ID:	FL12-1142	Test Date:	7/12/12	

UNCLASSIFIED

APPENDIX E. ISO 19438 TEST RESULTS

Filter: FL12-1196, Fleetguard FS1006

Vehicle: Bradley Fighting Vehicle

UNCLASSIFIED

TARDEC

FILTER ELEMENT MULTI-PASS TEST REPORT SHEET

ISO/DIS 19438

TEST No.:	MUL00474
TEST DATE:	8/1/2012
OPERATOR:	RVL

TEST CONTAMINANT	
TYPE:	A-3
BATCH No.:	5544Q

FILTER AND ELEMENT IDENTIFICATION	
P/N:	FS1006
ELEMENT ID:	FL12-1196
HOUSING ID:	
ELEMENT TYPE:	Spin on
MIN. ELEMENT BUBBLE	0.00
POINT (in. H ₂ O):	
BUBBLE POINT TO ISO	0.00
2942 (in. H ₂ O):	
WETTING FLUID:	ALCOHOL

TEST SYSTEM	
FLOW RATE (gpm):	1.50
INITIAL VOLUME (L):	16.00
FINAL VOLUME (L):	16.00

UPSTREAM CONCENTRATION (mg/L)			
BASE:	50.00	80%:	50.00

DIFFERENTIAL PRESSURE DATA	
TERMINAL ELEMENT (psid):	10.00
FILTER HOUSING (psid):	56.78
CLEAN ASSEMBLY (psid):	55.72
CLEAN ELEMENT (psid):	-1.06
NET (psid):	11.06

TEST FLUID	
TYPE:	Shell
REF:	5606
BATCH No.:	4055728
VISCOSITY (cSt):	15.00
TEMPERATURE (°F):	100.00
ANTI-STATIC TYPE ADDED:	Stadis 450
CONDUCTIVITY (pS/m):	1500.00

INJECTION SYSTEM			
	INITIAL	FINAL	AVERAGE
FLOW (L/min)	0.250	0.250	0.250
CONCEN. (mg/L)	1135.620	1135.620	1135.620

RETENTION CAPACITY (gram)			
TEST DUST			
INJECTED:	11.90	RETAINED:	11.10

COUNTING SYSTEM	COUNTER AND SENSOR REF.	FLOW RATE (mL/min)	DILUTION RATIO
UPSTREAM	Met One	50	4.0:1
DOWNSTREAM	Met One	50	4.0:1

COUNTER CALIBRATION METHOD	COUNTER CALIBRATION DATE
ISO 11171	6/30/2012

DIFFERENTIAL PRESSURE VERSUS CONTAMINANT ADDED			
% NET PRESSURE	TEST TIME (min)	ELEMENT DP (psid)	INJECTED MASS (gram)
5%	3.00	0.87	0.85
10%	4.00	1.40	1.14
15%	10.98	1.83	3.12
20%	11.98	2.68	3.40
40%	41.92	4.11	11.90
80%	0.00	0.00	0.00
100%	0.00	0.00	0.00

EFFICIENCY DATA								
	4.0 µm(c)	6.0 µm(c)	10.0 µm(c)	14.0 µm(c)	20.0 µm(c)	25.0 µm(c)	30.0 µm(c)	40.0 µm(c)
MAX. EFF. (%)	22.33	76.02	94.84	99.12	99.80	99.99	100.00	100.00
MIN. EFF. (%)	7.44	61.33	89.31	97.74	99.43	99.82	99.93	99.95
AVG. EFF. (%)	13.69	69.04	92.84	98.74	99.68	99.94	99.99	99.99

REMARKS

Test terminated due to inability to increase differential pressure above 40% of terminal dP

**TARDEC
FILTER ELEMENT MULTI-PASS TEST REPORT SHEET
ISO/DIS 19438**

P/N :	FS1006	TEST No. :	MUL00474
ID :	FL12-1196	TEST DATE :	8/1/12

PARTICLE DISTRIBUTION ANALYSIS (PARTICLES/MILLILITER)

Sample Point		4.0 um(c)	6.0 um(c)	8.0 um(c)	10.0 um(c)	12.0 um(c)	15.0 um(c)	25.0 um(c)	30.0 um(c)
Initial		1482.02	25.55	3.14	1.33	0.79	0.46	0.07	0.04
9.98 min	UP	87510.53	62448.00	35216.49	20959.49	13258.09	6790.99	968.45	452.37
-1.38 (psid)	DOWN	74867.60	13350.35	1407.18	201.30	72.54	29.87	1.19	0.38
	EFF.(%)	14.45	78.62	96.00	99.04	99.45	99.56	99.88	99.92
19.95 min	UP	147950.31	72153.70	27495.40	13635.43	7779.58	3763.73	543.29	258.62
0.58 (psid)	DOWN	119617.55	18662.02	1464.32	113.60	16.97	2.65	0.09	0.01
	EFF.(%)	19.15	74.14	94.67	99.17	99.78	99.93	99.98	99.99
29.94 min	UP	150907.11	76890.37	29285.66	14538.22	8304.60	3999.41	576.45	276.38
0.22 (psid)	DOWN	131183.83	22465.02	1775.20	133.57	16.99	1.01	0.04	0.02
	EFF.(%)	13.07	70.78	93.94	99.08	99.80	99.97	99.99	99.99
39.92 min	UP	152572.52	82504.55	33858.16	17356.90	10091.49	4915.41	726.90	325.56
1.06 (psid)	DOWN	134949.44	25779.43	2247.22	183.90	23.27	1.06	0.02	0.01
	EFF.(%)	11.55	68.75	93.36	98.94	99.77	99.98	100.00	100.00
49.90 min	UP	153724.69	81947.61	31142.48	15271.03	8683.49	4138.39	585.94	275.18
2.22 (psid)	DOWN	138978.47	30472.66	3596.30	456.16	79.74	4.25	0.01	0.01
	EFF.(%)	9.59	62.81	88.45	97.01	99.08	99.90	100.00	100.00
59.88 min	UP	155730.80	86749.95	32700.84	15603.13	8746.88	4128.94	580.13	273.50
2.03 (psid)	DOWN	142847.12	31360.77	2801.36	229.52	28.25	1.05	0.02	0.00
	EFF.(%)	8.27	63.85	91.43	98.53	99.68	99.97	100.00	100.00
69.87 min	UP	155002.98	83736.52	31509.00	15411.20	8778.42	4191.76	595.28	280.12
1.27 (psid)	DOWN	141824.61	30022.90	2673.04	226.46	28.81	1.02	0.01	0.01
	EFF.(%)	8.50	64.15	91.52	98.53	99.67	99.98	100.00	100.00
79.84 min	UP	155573.83	84982.82	31951.98	15559.27	8837.29	4208.48	599.34	285.80
1.42 (psid)	DOWN	144166.39	31591.86	2905.89	251.24	31.50	1.17	0.01	0.00
	EFF.(%)	7.33	62.83	90.91	98.39	99.64	99.97	100.00	100.00
89.83 min	UP	155454.59	84660.11	31537.13	15250.43	8632.04	4111.93	577.23	276.74
1.08 (psid)	DOWN	143655.28	32109.60	3061.77	273.30	35.65	1.14	0.01	0.00
	EFF.(%)	7.59	62.07	90.29	98.21	99.59	99.97	100.00	100.00

**TARDEC
FILTER ELEMENT MULTI-PASS TEST REPORT SHEET
ISO/DIS 19438**

P/N :	FS1006	TEST No. :	MUL00474
ID :	FL12-1196	TEST DATE :	8/1/12

PARTICLE DISTRIBUTION ANALYSIS (PARTICLES/MILLILITER)

Sample Point		4.0 um(c)	6.0 um(c)	8.0 um(c)	10.0 um(c)	12.0 um(c)	15.0 um(c)	25.0 um(c)	30.0 um(c)
99.81 min	UP	155891.61	85698.91	31974.42	15391.74	8691.75	4123.19	582.21	276.29
0.74 (psid)	DOWN	144057.33	33119.45	3273.41	301.07	39.16	1.33	0.00	0.00
	EFF.(%)	7.59	61.35	89.76	98.04	99.55	99.97	100.00	100.00
109.79 min	UP	156048.08	86832.06	32571.96	15629.34	8806.58	4176.35	590.49	277.94
1.13 (psid)	DOWN	144723.72	34397.04	3540.64	340.36	46.23	1.56	0.01	0.00
	EFF.(%)	7.26	60.39	89.13	97.82	99.48	99.96	100.00	100.00
119.76 min	UP	156332.23	87307.70	32599.34	15572.81	8759.69	4146.80	581.31	277.32
1.27 (psid)	DOWN	144877.05	35126.93	3668.89	351.70	47.41	1.58	0.01	0.01
	EFF.(%)	7.33	59.77	88.75	97.74	99.46	99.96	100.00	100.00
129.75 min	UP	156929.78	88175.12	32833.27	15582.54	8724.09	4118.35	572.30	270.50
1.04 (psid)	DOWN	145460.83	35965.37	3868.20	383.89	53.01	1.81	0.02	0.00
	EFF.(%)	7.31	59.21	88.22	97.54	99.39	99.96	100.00	100.00
139.73 min	UP	157285.00	89691.54	33635.76	15923.18	8905.00	4188.15	590.93	278.38
1.20 (psid)	DOWN	146285.89	37429.51	4193.41	428.35	60.11	2.10	0.00	0.00
	EFF.(%)	6.99	58.27	87.53	97.31	99.32	99.95	100.00	100.00
149.71 min	UP	157464.58	90327.87	33961.43	16051.45	8974.84	4252.23	606.91	289.37
1.54 (psid)	DOWN	146908.34	38131.42	4343.18	449.32	63.61	2.16	0.00	0.00
	EFF.(%)	6.70	57.79	87.21	97.20	99.29	99.95	100.00	100.00
159.70 min	UP	157388.37	90460.03	33971.02	15985.59	8917.85	4194.95	585.54	279.71
1.05 (psid)	DOWN	146434.50	38498.86	4438.41	462.89	65.06	2.15	0.00	0.00
	EFF.(%)	6.96	57.44	86.93	97.10	99.27	99.95	100.00	100.00
169.67 min	UP	157844.61	92554.69	35089.55	16368.58	9071.78	4237.35	588.94	280.35
0.36 (psid)	DOWN	147447.98	40896.52	5097.70	563.03	83.33	2.99	0.02	0.01
	EFF.(%)	6.59	55.81	85.47	96.56	99.08	99.93	100.00	100.00
179.66 min	UP	157991.83	92310.58	34808.86	16241.82	9017.41	4224.65	600.17	284.45
0.63 (psid)	DOWN	146752.48	39319.98	4724.06	509.67	73.84	2.49	0.00	0.00
	EFF.(%)	7.11	57.40	86.43	96.86	99.18	99.94	100.00	100.00

**TARDEC
FILTER ELEMENT MULTI-PASS TEST REPORT SHEET
ISO/DIS 19438**

P/N :	FS1006	TEST No. :	MUL00474
ID :	FL12-1196	TEST DATE :	8/1/12

PARTICLE DISTRIBUTION ANALYSIS (PARTICLES/MILLILITER)

Sample Point		4.0 um(c)	6.0 um(c)	8.0 um(c)	10.0 um(c)	12.0 um(c)	15.0 um(c)	25.0 um(c)	30.0 um(c)
189.64 min	UP	158002.72	92560.65	34970.41	16292.07	9022.62	4229.40	592.90	285.24
0.93 (psid)	DOWN	147821.77	40569.70	5017.59	553.55	81.30	3.04	0.01	0.00
	EFF.(%)	6.44	56.17	85.65	96.60	99.10	99.93	100.00	100.00
199.62 min	UP	157924.20	92322.95	34873.90	16235.58	8975.72	4187.84	583.23	276.18
0.63 (psid)	DOWN	150317.12	42058.84	5274.77	583.52	86.65	3.16	0.00	0.00
	EFF.(%)	4.82	54.44	84.87	96.41	99.03	99.92	100.00	100.00
209.61 min	UP	158442.16	94382.61	35979.86	16638.41	9158.52	4273.78	606.58	289.36
1.87 (psid)	DOWN	152059.58	45107.08	6057.86	717.12	109.33	4.08	0.00	0.00
	EFF.(%)	4.03	52.21	83.16	95.69	98.81	99.90	100.00	100.00
219.59 min	UP	157533.28	93460.87	35528.71	16455.12	9076.71	4219.75	592.74	278.49
1.73 (psid)	DOWN	153906.37	44359.10	5737.93	656.70	99.77	3.46	0.01	0.01
	EFF.(%)	2.30	52.54	83.85	96.01	98.90	99.92	100.00	100.00
229.57 min	UP	157513.36	93233.20	35510.00	16480.72	9087.41	4230.55	592.57	281.47
0.91 (psid)	DOWN	154117.98	44346.66	5863.31	680.42	102.29	3.81	0.02	0.01
	EFF.(%)	2.16	52.43	83.49	95.87	98.87	99.91	100.00	100.00
239.55 min	UP	158140.33	95291.25	36716.52	16892.14	9242.78	4266.86	600.38	288.14
-0.07 (psid)	DOWN	154526.03	47435.95	6789.40	846.57	135.96	5.38	0.01	0.01
	EFF.(%)	2.29	50.22	81.51	94.99	98.53	99.87	100.00	100.00
249.53 min	UP	158911.05	97066.70	37514.56	17149.12	9325.44	4306.50	602.77	287.74
0.38 (psid)	DOWN	152355.03	48824.71	7206.19	909.00	148.61	6.46	0.03	0.01
	EFF.(%)	4.13	49.70	80.79	94.70	98.41	99.85	100.00	100.00
259.51 min	UP	158175.83	94142.32	36202.92	16741.15	9185.12	4269.55	601.88	287.42
0.98 (psid)	DOWN	149848.12	45100.10	6329.53	774.76	121.82	4.91	0.00	0.00
	EFF.(%)	5.26	52.09	82.52	95.37	98.67	99.88	100.00	100.00
269.49 min	UP	157645.34	93703.58	36063.67	16674.27	9150.98	4257.35	602.29	285.18
0.95 (psid)	DOWN	149470.52	44805.62	6323.98	768.17	119.68	4.59	0.02	0.02
	EFF.(%)	5.19	52.18	82.46	95.39	98.69	99.89	100.00	99.99

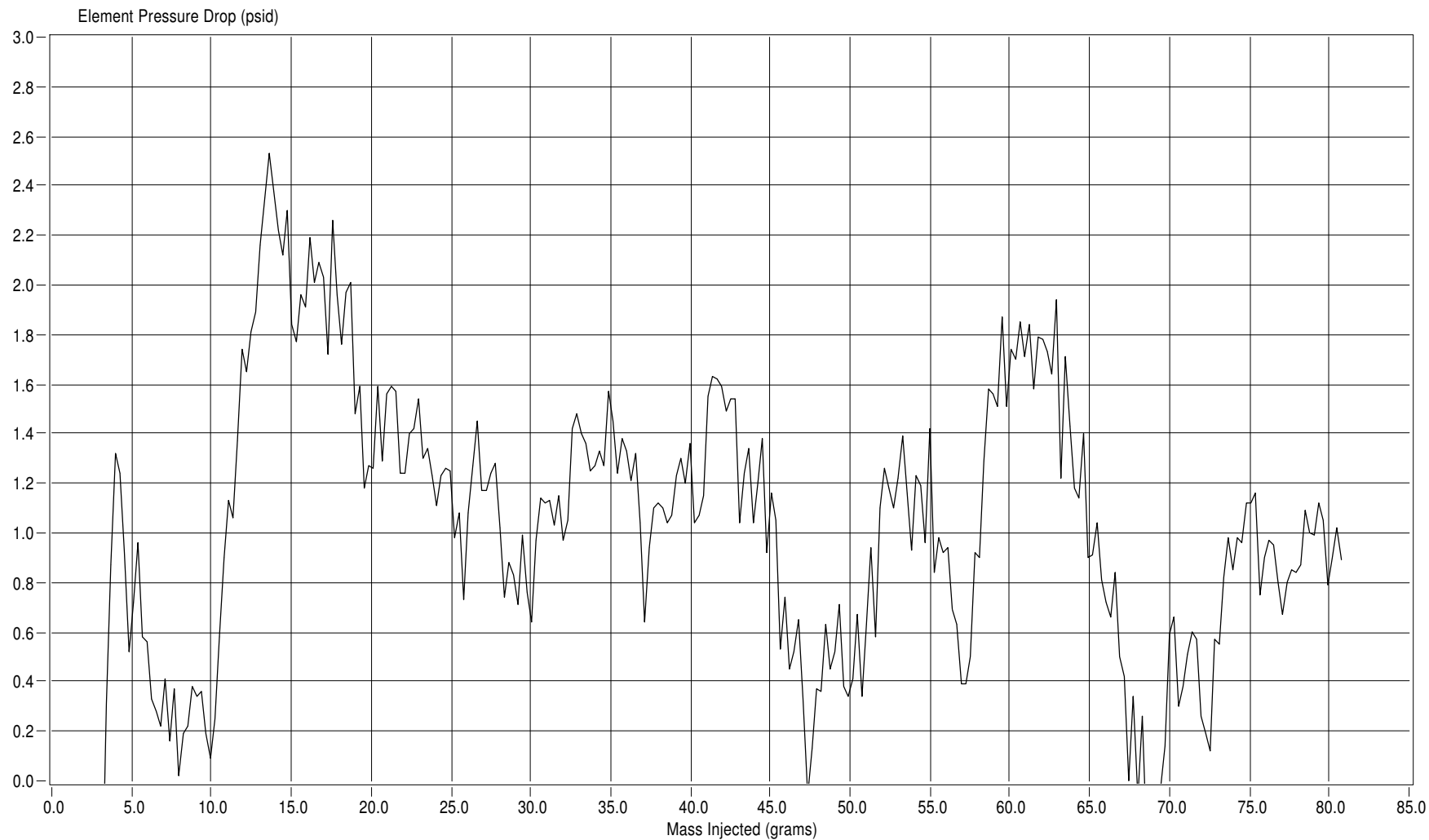
P/N :	FS1006	TEST No. :	MUL00474
ID :	FL12-1196	TEST DATE :	8/1/12

[illegible]

Differential Pressure Versus Contaminant Added

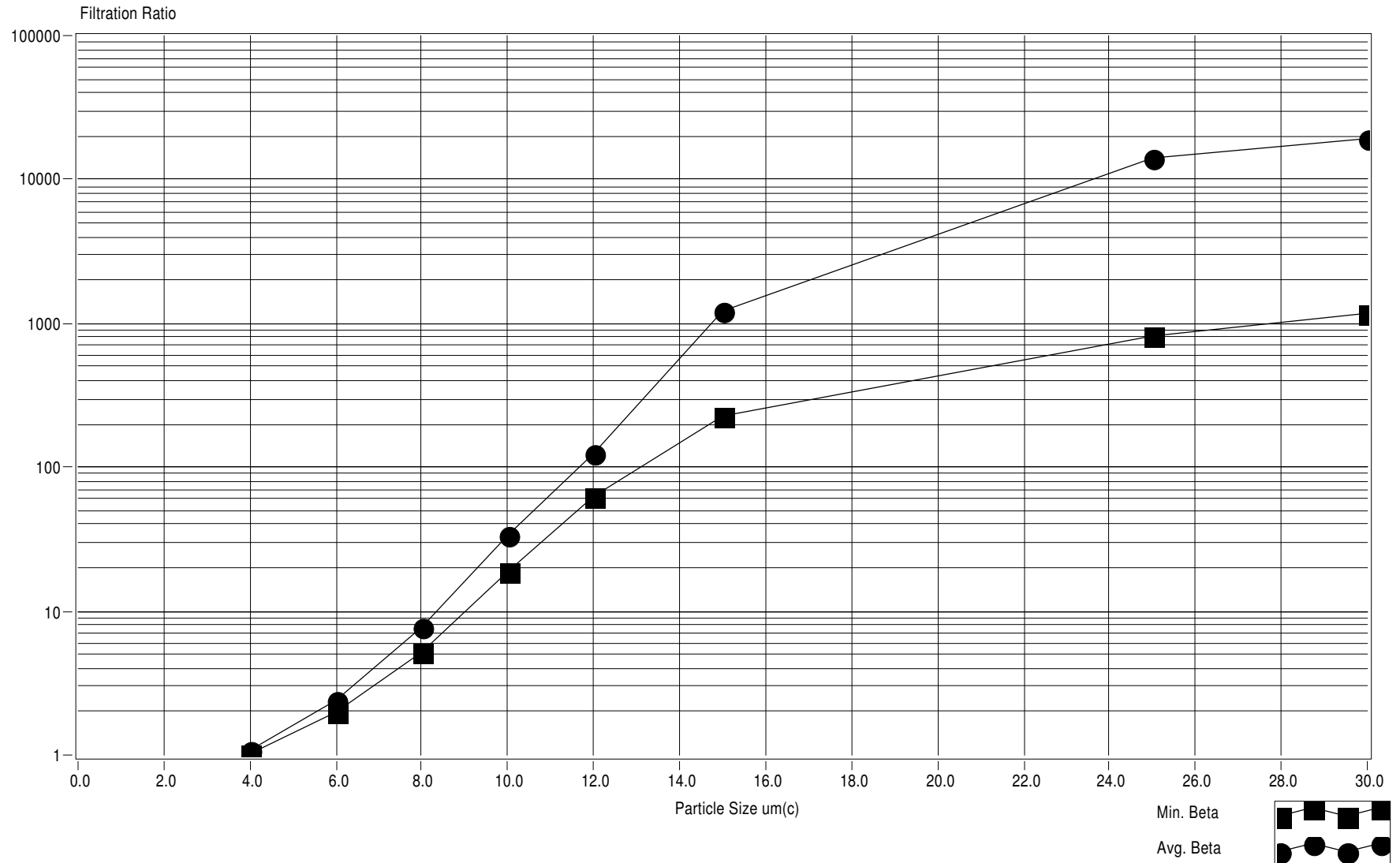
P/N.: FS1006
ID: FL12-1196
TERMINAL (psid): 10.00

TEST No.: MUL00474
TEST DATE: 8/1/12
OPERATOR: RVL



Filtration Ratio Versus Particle Size

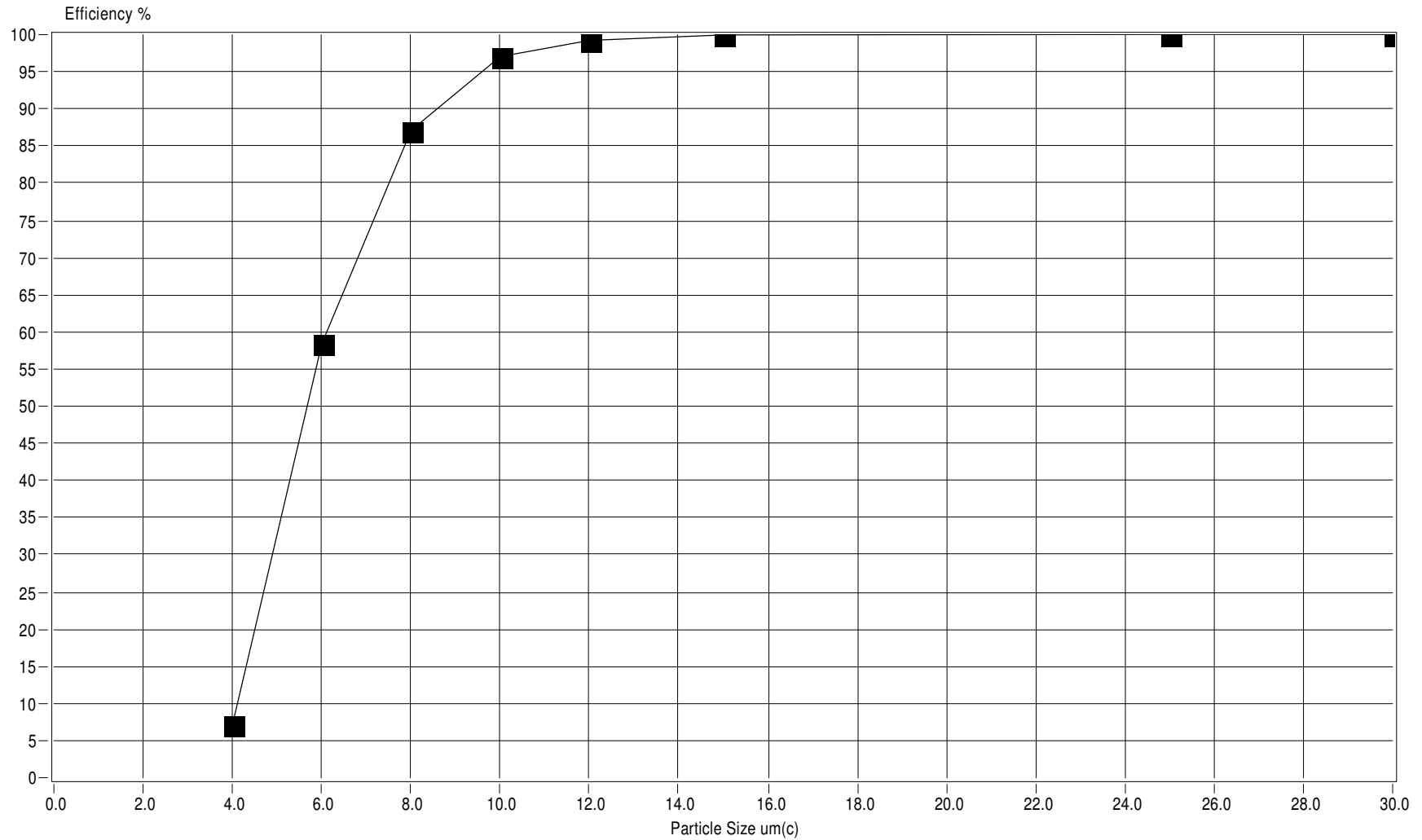
P/N.:	FS1006	TEST No.:	MUL00474
ID:	FL12-1196	TEST DATE:	8/1/12
TERMINAL (psid):	10.00	OPERATOR:	RVL



Efficiency Versus Particle Size

P/N.: FS1006
ID: FL12-1196
TERMINAL (psid): 10.00

TEST No.: MUL00474
TEST DATE: 8/1/12
OPERATOR: RVL



TARDEC MULTI-PASS TEST DATA SHEET

P/N:	FS1006
ID:	FL12-1196
Test No.:	MUL00474

P/N:	FS1006
Element ID:	FL12-1196
Test No.:	MUL00474
Test Date:	8/1/12
Operator:	RVL
Manufacture:	FLEETGAURD
Element Type:	Spin on
General Inf.:	BRADLEY-WD-17
Project No.:	100884
Company:	
Test Housing ID:	

Element Area (Sq.Inch)	1.000E+0
Capacity (g/Sq.Inch)	0.00
Flux (gpm/Sq.Inch)	1.50
No. of Pleats:	0.00
Pleat Height (Inch)	0.00
Pleat Length (Inch)	0.00
Filter O.D. (Inch)	0.00

Initial Injection Volume [l]:	78.00
Final Injection Volume [l]:	66.96
Inj. Temperature [oF]:	100.00

Test Fluid Ref:	5606
Batch No.:	4055728
Test Fluid Type:	Shell
Antistatic Type:	Stadis 450
Bubble Point Fluid:	ALCOHOL

Initial System Volume [l]:	16.00
Final System Volume [l]:	16.00
Anti-Static Added [ppm]:	100.00
Temperature [oF]:	100.00
Conductivity [pS/M]:	1500.00
Viscosity[cSt]:	15.00
RH%:	0.00
Flow Rate [gpm]:	1.50
Bubble Point [in. H2O]:	0.00
MIN. BUBBLE POINT [in. H2O]:	0.00

Dust Type:	A-3
Batch No.:	5544Q

Media:	
Layer 1 :	
Layer 2 :	
Layer 3 :	
Layer 4 :	
Layer 5 :	
Layer 6 :	
Layer 7 :	

Test Sys. Cleanliness [particle/ml]:	1482.019
Inj. Sys.Cleanliness [particle/ml]:	0.000
Approximate Element Capacity [g] :	0.000
Required Inj. Grav. Level [mg/l] :	1135.620
Contaminant Required [g] :	88.578
Calculated Test Time[min] :	0.000
Sensor Flow [ml/min] :	50.000

Test Terminated

Page # 1

TARDEC MULTI-PASS TEST DATA SHEET

P/N:	FS1006
ID:	FL12-1196
Test No.:	MUL00474

Terminal Pressure [psid]:	10.00
Housing Pressure [psid]:	59.15
Clean Assembly [psid]:	55.72
Clean Filter Media [psid]:	-3.44
Net [psid]:	13.44

Dust Injected [g]:	0.00
Dust Retained [g]:	-0.80

Base U.G.L [mg/l]:	50.00
Final U.G.L [mg/L]:	50.00

Initial Inj Grav. [mg/l]:	1135.62
Final Inj Grav. [mg/L]:	1135.62

Initial Inj Flow [lpm]:	0.25
Final Inj Flow [lpm]:	0.25

% Assembly	Time at	Time of Count
D.P.	% of Assembly	at % of
	D.P. [min]	Assembly
		D.P. [min]
2.5%	0.07	0.00
5%	0.14	0.00
10%	2.68	2.00
15%	3.26	3.00
20%	4.55	4.00
30%	12.67	11.98
40%	44.17	43.91
80%	0.00	0.00
100%	0.00	0.00

Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
BCK	55.72	1.00	UP	1242.29	28.95	4.54	2.16	1.35	0.85	0.14	0.08	50.00	100.85
0		1.00	DOWN	1721.75	22.14	1.74	0.51	0.22	0.08	0.00	0.00	50.57	
			BETA	0.72	1.31	2.61	4.24	6.14	10.62	99999.99	99999.99		
0.00	56.78	1.00	UP	10933.97	3910.28	1572.87	770.89	419.50	199.52	26.58	12.21	48.23	99.96
1		1.00	DOWN	3480.26	88.66	4.16	0.55	0.14	0.06	0.00	0.00	49.71	
			BETA	3.14	44.10	378.09	1401.62	2996.43	3325.33	99999.99	99999.99		
1.00	56.82	1.00	UP	26443.50	13884.58	6334.28	3314.06	1902.09	923.41	127.10	59.89	51.02	99.75
2		1.00	DOWN	14072.05	2213.11	227.97	17.32	2.10	0.14	0.02	0.00	49.49	
			BETA	1.88	6.27	27.79	191.34	905.76	6595.79	6355.00	99999.99		
2.00	55.43	1.00	UP	30852.54	20556.53	10995.44	6269.49	3807.85	1888.94	268.95	127.23	49.82	99.76
3		1.00	DOWN	25182.77	5400.48	585.53	50.26	5.80	0.20	0.04	0.04	49.61	
			BETA	1.23	3.81	18.78	124.74	656.53	9444.70	6723.75	3180.75		
3.00	57.65	1.00	UP	32127.15	23507.94	13512.72	8016.29	5027.64	2558.64	362.26	171.75	50.34	99.95
4		1.00	DOWN	29490.47	7985.56	932.39	80.05	8.92	0.20	0.00	0.00	49.94	
			BETA	1.09	2.94	14.49	100.14	563.64	12793.20	99999.99	99999.99		
4.00	58.18	1.00	UP	32703.40	24593.99	14405.61	8673.84	5502.32	2817.32	404.93	191.00	49.50	100.20
5		1.00	DOWN	29951.14	8730.60	1135.17	163.23	50.81	17.80	0.75	0.30	48.27	
			BETA	1.09	2.82	12.69	53.14	108.29	158.28	539.91	636.67		
4.99	55.44	3.00	UP	98317.14	74709.59	43959.91	26531.64	16857.86	8616.90	1238.19	568.06	49.44	100.59
6		3.84	DOWN	82305.08	14195.55	2030.32	555.16	291.45	137.89	5.06	1.40	49.80	
			BETA	1.19	5.26	21.65	47.79	57.84	62.49	244.70	405.76		
5.99	57.33	2.99	UP	98731.64	75948.11	45076.10	27340.68	17462.17	9045.01	1306.97	620.20	49.22	100.97
7		3.40	DOWN	79828.37	13237.45	1284.06	138.47	37.50	12.34	0.69	0.48	50.06	
			BETA	1.24	5.74	35.10	197.45	465.66	732.98	1894.16	1292.08		
6.99	57.85	3.02	UP	100473.33	77662.72	46123.61	27993.01	17861.88	9179.32	1331.43	617.33	49.67	101.32
8		3.24	DOWN	81311.26	14747.02	1351.49	123.67	22.75	5.97	0.20	0.00	49.97	
			BETA	1.24	5.27	34.13	226.35	785.14	1537.57	6657.15	99999.99		
7.99	58.21	3.11	UP	102366.92	79326.82	47228.05	28739.72	18384.48	9485.77	1386.78	649.19	50.65	101.69
9		5.09	DOWN	109670.55	19317.55	1766.72	176.99	38.27	10.67	0.41	0.21	49.59	
			BETA	0.93	4.11	26.73	162.38	480.39	889.01	3382.39	3091.38		
8.98	57.37	5.09	UP	147854.12	81386.81	36209.45	19421.26	11710.30	5833.99	748.56	349.09	50.54	101.93
10		7.37	DOWN	111516.33	15238.70	1350.14	171.52	58.07	24.25	1.20	0.30	48.77	
			BETA	1.33	5.34	26.82	113.23	201.66	240.58	623.80	1163.63		
9.98	57.77	5.28	UP	150189.66	71520.35	27572.21	13767.63	7902.60	3852.82	565.41	274.03	50.48	102.13
11		6.39	DOWN	116658.23	17149.99	1422.37	124.80	27.28	7.08	0.39	0.13	50.09	
			BETA	1.29	4.17	19.38	110.32	289.68	544.18	1449.77	2107.92		
10.98	58.61	4.97	UP	143414.81	68610.99	26346.17	13046.87	7446.36	3624.56	526.48	247.51	49.95	102.32
12		5.64	DOWN	117973.18	17688.51	1421.03	113.32	17.77	3.99	0.34	0.00	49.96	
			BETA	1.22	3.88	18.54	115.13	419.04	908.41	1548.47	99999.99		
11.98	59.46	5.00	UP	145346.23	69456.17	26522.12	13126.61	7474.48	3607.33	525.49	251.43	49.83	102.46
13		5.13	DOWN	116632.31	17075.65	1323.56	97.43	15.65	2.69	0.00	0.00	50.19	
			BETA	1.25	4.07	20.04	134.73	477.60	1341.01	99999.99	99999.99		
12.97	60.02	5.02	UP	146920.69	70518.22	26765.42	13223.33	7546.06	3660.97	504.43	234.05	49.56	102.64
14		4.86	DOWN	110322.42	17061.06	1326.44	99.57	15.81	2.45	0.00	0.00	49.53	
			BETA	1.33	4.13	20.18	132.80	477.30	1494.27	99999.99	99999.99		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
13.97	60.47	4.98	UP	146876.19	71261.88	27024.58	13382.43	7624.28	3676.55	530.68	250.26	49.84	102.80
15		4.72	DOWN	111263.91	17893.96	1407.53	105.98	16.50	1.91	0.10	0.00	49.97	
			BETA	1.32	3.98	19.20	126.27	462.08	1924.90	5306.80	99999.99		
14.97	60.39	5.01	UP	148614.08	72536.44	27529.29	13660.96	7796.52	3754.55	541.03	261.00	49.93	102.94
16		4.64	DOWN	114556.18	18677.94	1467.15	111.03	15.63	1.78	0.09	0.00	50.08	
			BETA	1.30	3.88	18.76	123.04	498.82	2109.30	6011.44	99999.99		
15.96	60.07	5.00	UP	148780.33	73400.93	27868.83	13764.31	7800.55	3763.34	542.68	247.41	49.72	103.08
17		5.44	DOWN	134857.28	21121.42	1603.50	127.13	17.50	2.42	0.00	0.00	49.78	
			BETA	1.10	3.48	17.38	108.27	445.75	1555.10	99999.99	99999.99		
16.97	59.67	4.99	UP	149216.50	74209.95	28286.90	14034.31	8007.02	3874.56	563.39	271.61	49.99	103.25
18		5.38	DOWN	125613.03	18810.03	1432.22	107.69	14.55	2.39	0.00	0.00	50.05	
			BETA	1.19	3.95	19.75	130.32	550.31	1621.15	99999.99	99999.99		
17.96	59.87	4.99	UP	149596.95	74682.08	28366.12	14101.76	8043.41	3890.77	555.36	267.21	49.95	103.42
19		4.97	DOWN	122944.27	20173.78	1595.40	121.89	12.46	1.11	0.00	0.00	50.08	
			BETA	1.22	3.70	17.78	115.69	645.54	3505.20	99999.99	99999.99		
18.96	60.11	5.01	UP	150547.73	75339.93	28672.34	14246.09	8154.57	3931.87	577.92	281.73	49.99	103.51
20		5.01	DOWN	125354.73	20967.81	1644.04	127.19	16.51	0.71	0.00	0.00	50.40	
			BETA	1.20	3.59	17.44	112.01	493.92	5537.85	99999.99	99999.99		
19.95	59.73	5.00	UP	150411.64	75703.93	28859.95	14364.32	8204.44	3979.38	578.93	273.39	50.12	103.66
21		4.98	DOWN	126638.03	21291.36	1677.43	127.06	16.27	0.50	0.00	0.00	49.44	
			BETA	1.19	3.56	17.20	113.05	504.27	7958.76	99999.99	99999.99		
20.96	59.71	4.99	UP	150412.39	75936.08	28928.77	14393.28	8222.52	3994.34	569.71	271.71	49.99	103.76
22		5.01	DOWN	128748.84	21633.84	1693.93	131.77	17.58	1.41	0.10	0.10	49.95	
			BETA	1.17	3.51	17.08	109.23	467.72	2832.87	5697.10	2717.10		
21.95	59.48	5.01	UP	151009.30	76225.04	28823.59	14283.94	8148.51	3950.20	561.58	267.14	49.66	103.90
23		4.98	DOWN	129754.65	21753.70	1683.23	123.98	15.60	1.41	0.10	0.00	50.08	
			BETA	1.16	3.50	17.12	115.21	522.34	2801.56	5615.80	99999.99		
22.95	59.43	4.99	UP	150418.31	76662.46	29216.19	14488.52	8283.45	3965.01	564.01	264.70	50.15	104.06
24		5.00	DOWN	130649.20	22001.79	1727.82	127.03	16.95	1.21	0.00	0.00	49.99	
			BETA	1.15	3.48	16.91	114.06	488.70	3276.87	99999.99	99999.99		
23.95	59.37	5.01	UP	151274.17	76831.78	29244.78	14490.99	8256.86	3985.91	589.61	285.35	49.78	104.23
25		4.99	DOWN	130958.53	22193.66	1747.22	135.84	18.92	1.61	0.00	0.00	50.06	
			BETA	1.16	3.46	16.74	106.68	436.41	2475.72	99999.99	99999.99		
24.94	59.56	4.99	UP	150780.56	77356.72	29596.22	14680.74	8370.04	4017.33	578.07	269.66	49.90	104.37
26		5.00	DOWN	132766.62	22719.03	1794.07	133.21	17.66	0.50	0.00	0.00	50.08	
			BETA	1.14	3.40	16.50	110.21	473.95	8034.66	99999.99	99999.99		
25.95	59.31	5.01	UP	151105.12	77309.33	29387.58	14598.25	8327.23	4008.16	567.28	278.59	49.87	104.50
27		5.00	DOWN	132916.81	22863.14	1803.31	137.12	15.95	1.41	0.10	0.10	49.36	
			BETA	1.14	3.38	16.30	106.46	522.08	2842.67	5672.80	2785.90		
26.94	59.52	4.99	UP	150896.72	77375.42	29522.31	14682.26	8428.12	4074.42	598.90	296.63	49.98	104.62
28		5.00	DOWN	133088.81	23061.28	1833.43	134.62	17.14	0.50	0.10	0.00	49.98	
			BETA	1.13	3.36	16.10	109.06	491.72	8148.84	5989.00	99999.99		
27.95	59.17	5.01	UP	151461.19	77706.84	29592.46	14659.42	8411.57	4031.05	578.19	279.19	49.81	104.80
29		4.98	DOWN	133031.37	23375.97	1870.09	141.08	15.47	0.90	0.00	0.00	50.06	
			BETA	1.14	3.32	15.82	103.91	543.73	4478.94	99999.99	99999.99		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
28.94	59.34	4.99	UP	151301.73	77796.13	29684.75	14740.50	8393.23	3988.33	578.20	277.41	50.14	104.95
30		4.98	DOWN	133285.34	23756.38	1921.45	144.02	18.33	0.70	0.00	0.00	49.90	
			BETA	1.14	3.27	15.45	102.35	457.90	5697.61	99999.99	99999.99		
29.94	59.37	5.01	UP	151801.75	77684.48	29413.87	14586.73	8316.84	3974.75	556.43	263.49	50.00	105.06
31		4.99	DOWN	133106.66	23822.16	1926.59	152.89	20.53	1.51	0.00	0.00	50.06	
			BETA	1.14	3.26	15.27	95.41	405.11	2632.28	99999.99	99999.99		
30.93	59.53	4.99	UP	151179.97	77815.21	29704.10	14674.04	8346.49	4002.48	565.37	270.61	49.83	105.22
32		4.99	DOWN	132875.66	23790.60	1917.24	144.21	17.71	1.11	0.00	0.00	49.90	
			BETA	1.14	3.27	15.49	101.75	471.29	3605.84	99999.99	99999.99		
31.94	59.49	5.01	UP	152119.02	78546.00	29967.57	14836.69	8513.59	4078.07	572.59	269.90	50.01	105.38
33		5.00	DOWN	133727.70	24402.79	2011.96	144.45	17.17	1.31	0.00	0.00	49.97	
			BETA	1.14	3.22	14.89	102.71	495.84	3113.03	99999.99	99999.99		
32.93	59.51	5.01	UP	152157.41	78277.46	29515.88	14584.36	8319.65	3988.67	569.06	268.98	50.14	105.47
34		5.01	DOWN	133466.42	24319.63	1981.28	154.97	20.61	1.21	0.00	0.00	50.06	
			BETA	1.14	3.22	14.90	94.11	403.67	3296.42	99999.99	99999.99		
33.93	59.34	4.97	UP	151149.20	78237.15	29730.56	14735.69	8445.81	4055.29	570.64	269.32	49.96	105.63
35		5.00	DOWN	133716.25	24628.32	2045.81	150.95	18.68	1.01	0.00	0.00	49.80	
			BETA	1.13	3.18	14.53	97.62	452.13	4015.14	99999.99	99999.99		
34.93	59.24	5.00	UP	152611.19	83584.01	35679.18	18768.44	11047.20	5462.58	862.94	382.60	50.18	105.36
36		4.99	DOWN	133673.20	24943.73	2094.22	169.74	20.04	0.60	0.00	0.00	50.08	
			BETA	1.14	3.35	17.04	110.57	551.26	9104.30	99999.99	99999.99		
35.93	59.40	5.01	UP	154058.84	91686.87	44115.27	24354.63	14709.34	7435.78	1182.12	500.33	50.03	104.66
37		4.99	DOWN	135590.12	26935.28	2494.11	213.25	29.72	0.91	0.00	0.00	50.08	
			BETA	1.14	3.40	17.69	114.21	494.93	8171.19	99999.99	99999.99		
36.92	59.73	5.01	UP	153968.92	89264.86	40632.72	21648.16	12788.28	6296.10	950.97	395.41	49.90	104.14
38		5.00	DOWN	137589.05	28612.07	2813.81	262.52	36.75	1.21	0.20	0.10	50.03	
			BETA	1.12	3.12	14.44	82.46	347.98	5203.39	4754.85	3954.10		
37.93	60.05	4.99	UP	153053.75	85709.45	36037.29	18442.92	10720.90	5206.97	770.87	337.55	50.03	103.63
39		5.00	DOWN	137749.52	28259.38	2665.45	237.04	28.77	1.21	0.00	0.00	50.09	
			BETA	1.11	3.03	13.52	77.81	372.64	4303.28	99999.99	99999.99		
38.92	60.28	5.00	UP	153625.19	84240.05	33785.19	16937.34	9706.83	4653.39	668.04	297.45	50.40	103.13
40		5.01	DOWN	137999.75	28080.32	2521.75	208.97	22.75	0.51	0.00	0.00	49.95	
			BETA	1.11	3.00	13.40	81.05	426.67	9124.29	99999.99	99999.99		
39.92	60.21	5.01	UP	153718.81	83245.85	32607.31	16190.07	9230.52	4416.23	622.11	288.92	49.78	102.71
41		4.99	DOWN	137489.91	27767.69	2470.17	198.52	22.98	0.50	0.00	0.00	49.98	
			BETA	1.12	3.00	13.20	81.55	401.68	8832.46	99999.99	99999.99		
40.91	60.52	5.00	UP	153592.45	82306.05	31646.11	15626.51	8875.14	4229.46	602.56	281.53	49.95	102.38
42		5.01	DOWN	137455.53	27263.57	2373.38	195.73	25.48	0.71	0.00	0.00	50.37	
			BETA	1.12	3.02	13.33	79.84	348.32	5956.99	99999.99	99999.99		
41.92	60.89	4.99	UP	153366.56	81982.05	31412.20	15558.06	8876.87	4223.00	609.61	280.16	49.82	101.98
43		5.01	DOWN	137646.27	27269.09	2336.41	184.72	23.76	1.62	0.00	0.00	50.10	
			BETA	1.11	3.01	13.44	84.23	373.61	2606.79	99999.99	99999.99		
42.91	60.80	5.00	UP	153570.52	81388.38	30820.20	15148.59	8642.62	4117.16	572.92	272.47	50.30	101.71
44		4.99	DOWN	137270.56	27222.23	2302.19	184.18	22.69	1.31	0.00	0.00	49.98	
			BETA	1.12	2.99	13.39	82.25	380.90	3142.87	99999.99	99999.99		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
43.91	60.96	5.00	UP	153490.34	81110.98	30586.67	15039.05	8587.38	4114.80	583.36	273.51	49.49	101.43
45		5.01	DOWN	137478.77	27127.99	2322.79	189.07	23.36	1.42	0.00	0.00	50.10	
			BETA	1.12	2.99	13.17	79.54	367.61	2897.75	99999.99	99999.99		
44.91	61.04	5.00	UP	153631.20	81139.96	30679.27	15053.06	8591.63	4082.55	574.86	274.04	50.17	101.19
46		4.99	DOWN	137444.20	27210.18	2310.43	185.66	22.99	1.01	0.10	0.10	50.10	
			BETA	1.12	2.98	13.28	81.08	373.71	4042.13	5748.60	2740.40		
45.91	61.31	5.01	UP	153698.09	80929.67	30387.13	14882.96	8450.50	4030.74	572.23	267.93	49.91	101.02
47		5.00	DOWN	137330.95	27091.29	2303.64	174.09	22.00	0.81	0.00	0.00	49.97	
			BETA	1.12	2.99	13.19	85.49	384.11	4976.22	99999.99	99999.99		
46.91	61.50	5.00	UP	153531.87	81011.28	30579.53	15052.49	8589.40	4103.91	579.22	272.15	49.91	100.82
48		5.01	DOWN	137913.09	27275.36	2334.19	177.14	22.56	0.51	0.00	0.00	50.09	
			BETA	1.11	2.97	13.10	84.98	380.74	8046.88	99999.99	99999.99		
47.90	61.68	4.99	UP	153253.59	80759.62	30371.04	14884.87	8489.95	4069.33	589.61	274.40	49.92	100.65
49		5.00	DOWN	137848.83	27161.38	2331.01	192.64	23.32	0.81	0.00	0.00	50.00	
			BETA	1.11	2.97	13.03	77.27	364.06	5023.86	99999.99	99999.99		
48.90	61.53	5.01	UP	155393.36	85602.23	32335.35	15274.65	8500.86	3996.75	552.90	266.71	50.05	100.55
50		5.00	DOWN	151906.64	59337.86	14878.79	2879.83	588.26	33.81	0.00	0.00	50.30	
			BETA	1.02	1.44	2.17	5.30	14.45	118.21	99999.99	99999.99		
49.90	61.37	5.00	UP	157863.16	95483.69	37517.05	16979.40	9107.27	4180.72	597.25	276.38	50.06	100.40
51		5.00	DOWN	146119.70	36921.54	4009.94	383.18	51.85	2.11	0.00	0.00	50.08	
			BETA	1.08	2.59	9.36	44.31	175.65	1981.38	99999.99	99999.99		
50.89	61.27	5.00	UP	157267.09	92428.64	35714.29	16603.13	9120.89	4256.41	590.29	282.23	50.06	100.34
52		5.00	DOWN	144955.27	33826.61	3131.04	254.28	30.44	0.71	0.00	0.00	49.95	
			BETA	1.08	2.73	11.41	65.29	299.64	5994.94	99999.99	99999.99		
51.90	61.45	5.00	UP	156517.06	89389.13	33820.44	15955.67	8884.83	4184.58	579.41	264.39	50.20	100.21
53		5.01	DOWN	144066.89	32414.16	2870.21	224.13	23.97	0.61	0.00	0.00	50.09	
			BETA	1.09	2.76	11.78	71.19	370.66	6859.97	99999.99	99999.99		
52.89	60.99	5.01	UP	156284.73	87244.16	32761.65	15615.91	8776.19	4146.93	570.35	269.44	50.03	100.16
54		5.02	DOWN	143320.81	31223.98	2700.49	210.06	24.74	1.12	0.00	0.00	50.08	
			BETA	1.09	2.79	12.13	74.34	354.74	3702.62	99999.99	99999.99		
53.90	60.92	4.99	UP	155383.11	85307.17	31686.56	15212.59	8572.22	4061.12	576.69	270.97	49.73	100.13
55		5.00	DOWN	142598.22	30669.65	2602.20	204.06	26.08	0.71	0.10	0.00	49.98	
			BETA	1.09	2.78	12.18	74.55	328.69	5719.89	5766.90	99999.99		
54.89	61.11	5.01	UP	155575.64	84937.39	31616.50	15321.76	8682.64	4105.96	575.36	274.59	50.09	100.07
56		5.00	DOWN	141903.39	30103.99	2525.76	200.94	24.61	1.41	0.00	0.00	50.01	
			BETA	1.10	2.82	12.52	76.25	352.81	2912.03	99999.99	99999.99		
55.89	61.06	4.98	UP	154659.72	83671.30	31135.31	15120.72	8606.48	4092.01	579.70	273.88	49.73	100.12
57		4.98	DOWN	141430.31	29769.68	2531.62	192.29	23.36	0.81	0.00	0.00	49.64	
			BETA	1.09	2.81	12.30	78.63	368.43	5051.86	99999.99	99999.99		
56.88	61.34	5.00	UP	154574.61	83333.13	31049.36	15137.86	8628.48	4127.08	584.92	275.78	49.86	100.14
58		5.01	DOWN	141729.98	29783.13	2559.34	205.98	27.61	1.21	0.10	0.00	50.09	
			BETA	1.09	2.80	12.13	73.49	312.51	3410.81	5849.20	99999.99		
57.89	61.16	5.00	UP	155038.02	83336.04	31063.27	15139.87	8604.00	4094.14	576.08	284.09	50.51	100.16
59		5.01	DOWN	141311.59	29392.29	2508.19	204.38	22.14	0.51	0.00	0.00	50.41	
			BETA	1.10	2.84	12.38	74.08	388.62	8027.73	99999.99	99999.99		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
58.88	61.24	5.00	UP	154144.78	82368.84	30643.97	14944.39	8485.82	4040.50	571.25	263.27	50.11	100.29
60		4.99	DOWN	141035.00	29502.65	2574.82	215.88	27.68	1.31	0.00	0.00	49.91	
			BETA	1.09	2.79	11.90	69.23	306.57	3084.35	99999.99	99999.99		
59.88	61.18	5.01	UP	155061.16	83292.03	31248.28	15242.12	8679.20	4144.04	588.91	277.81	50.17	100.16
61		5.00	DOWN	141475.87	29763.13	2635.15	224.82	30.41	0.71	0.00	0.00	50.01	
			BETA	1.10	2.80	11.86	67.80	285.41	5836.68	99999.99	99999.99		
60.87	60.87	5.00	UP	155125.52	83352.16	31072.24	15182.33	8656.89	4127.77	583.17	278.85	49.99	100.05
62		4.99	DOWN	140724.27	29455.04	2564.98	210.12	25.97	1.41	0.00	0.00	50.09	
			BETA	1.10	2.83	12.11	72.26	333.34	2927.50	99999.99	99999.99		
61.88	61.41	5.00	UP	154717.64	82913.40	31053.31	15151.72	8623.56	4128.02	578.85	269.87	50.05	99.97
63		5.03	DOWN	141663.91	29531.89	2560.02	204.11	26.19	0.41	0.00	0.00	49.91	
			BETA	1.09	2.81	12.13	74.23	329.27	10068.34	99999.99	99999.99		
62.87	61.11	4.99	UP	154672.44	82760.67	30901.97	15087.92	8597.46	4085.40	556.28	262.45	50.00	99.89
64		5.02	DOWN	141303.47	29436.35	2573.66	220.77	31.34	1.12	0.00	0.00	50.09	
			BETA	1.09	2.81	12.01	68.34	274.33	3647.68	99999.99	99999.99		
63.88	60.91	5.01	UP	154850.56	82664.55	30691.39	14927.22	8444.68	4019.84	568.25	268.72	49.97	99.83
65		4.97	DOWN	140469.81	29447.06	2597.75	220.12	25.95	0.80	0.00	0.00	50.00	
			BETA	1.10	2.81	11.81	67.81	325.42	5024.80	99999.99	99999.99		
64.87	61.12	4.99	UP	154202.02	82373.93	30675.38	14976.73	8503.87	4028.14	563.48	264.36	49.87	99.89
66		5.02	DOWN	141281.59	29556.26	2595.59	213.34	25.73	1.22	0.00	0.00	50.36	
			BETA	1.09	2.79	11.82	70.20	330.50	3301.75	99999.99	99999.99		
65.87	61.16	5.01	UP	155337.16	85027.27	32735.94	16149.25	9218.65	4418.06	656.17	309.83	50.40	99.54
67		4.97	DOWN	141176.52	29970.29	2704.27	234.63	27.21	0.70	0.00	0.00	49.76	
			BETA	1.10	2.84	12.11	68.83	338.80	6311.51	99999.99	99999.99		
66.86	60.63	5.00	UP	155132.02	84777.66	32178.07	15802.51	9044.58	4339.30	601.20	284.76	49.97	99.97
68		5.03	DOWN	143737.81	31062.16	2825.06	241.17	31.66	0.81	0.10	0.10	49.97	
			BETA	1.08	2.73	11.39	65.52	285.68	5357.16	6012.00	2847.60		
67.87	60.74	4.98	UP	154578.14	83738.65	31198.89	15151.83	8611.96	4103.59	589.99	274.30	49.84	100.61
69		5.00	DOWN	143091.27	30720.58	2784.24	237.67	29.17	1.31	0.00	0.00	49.97	
			BETA	1.08	2.73	11.21	63.75	295.23	3132.51	99999.99	99999.99		
68.86	60.33	5.02	UP	156353.27	86464.81	33334.57	16440.35	9403.39	4523.44	666.46	310.26	49.87	100.33
70		4.98	DOWN	143321.59	31286.25	2889.64	257.89	34.45	1.71	0.00	0.00	50.02	
			BETA	1.09	2.76	11.54	63.75	272.96	2645.29	99999.99	99999.99		
69.87	60.42	5.01	UP	156106.86	87506.45	34602.50	17216.86	9881.81	4761.00	705.87	332.82	49.98	100.05
71		5.02	DOWN	144433.48	31906.93	3005.57	271.23	37.56	1.62	0.00	0.00	50.01	
			BETA	1.08	2.74	11.51	63.48	263.09	2938.89	99999.99	99999.99		
70.86	60.41	5.00	UP	155755.52	86459.46	33441.40	16533.24	9462.96	4529.30	651.35	306.97	50.00	99.91
72		4.97	DOWN	143847.17	31945.81	2989.09	258.27	31.21	1.61	0.00	0.00	49.96	
			BETA	1.08	2.71	11.19	64.02	303.20	2813.23	99999.99	99999.99		
71.87	60.74	4.99	UP	155305.41	84885.47	31849.47	15516.12	8789.20	4194.65	599.71	291.85	49.89	99.80
73		5.03	DOWN	145071.84	31817.55	2930.74	246.74	29.57	0.91	0.10	0.00	50.04	
			BETA	1.07	2.67	10.87	62.88	297.23	4609.51	5997.10	99999.99		
72.86	60.44	5.01	UP	155631.73	84559.21	31421.72	15210.82	8607.72	4087.58	584.81	274.23	49.79	99.77
74		4.98	DOWN	143809.12	31508.85	2853.08	245.38	32.84	1.11	0.00	0.00	49.97	
			BETA	1.08	2.68	11.01	61.99	262.11	3682.50	99999.99	99999.99		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
73.85	60.71	5.01	UP	156150.62	85327.58	32127.06	15655.69	8901.54	4254.35	609.78	294.35	50.24	99.72
75		5.01	DOWN	144308.87	31531.17	2861.15	250.18	32.86	0.81	0.00	0.00	50.05	
			BETA	1.08	2.71	11.23	62.58	270.89	5252.28	99999.99	99999.99		
74.86	60.74	5.00	UP	155367.00	84520.73	31484.62	15270.46	8642.35	4106.36	578.15	272.73	49.76	99.70
76		5.00	DOWN	144223.59	31485.24	2904.68	244.22	27.80	1.11	0.00	0.00	50.04	
			BETA	1.08	2.68	10.84	62.53	310.88	3699.42	99999.99	99999.99		
75.85	60.72	5.01	UP	155546.87	84239.68	31155.37	15073.14	8549.35	4044.15	565.12	269.27	50.14	99.69
77		5.02	DOWN	144216.69	31407.52	2881.69	248.40	30.78	1.22	0.00	0.00	49.97	
			BETA	1.08	2.68	10.81	60.68	277.76	3314.88	99999.99	99999.99		
76.85	60.39	5.00	UP	155400.94	84251.62	31167.06	15075.06	8552.85	4049.54	561.35	270.82	50.63	99.68
78		4.99	DOWN	143780.34	31426.46	2860.85	252.93	30.99	1.01	0.00	0.00	49.97	
			BETA	1.08	2.68	10.89	59.60	275.99	4009.45	99999.99	99999.99		
77.84	60.39	4.99	UP	155046.06	84070.28	31180.09	15066.78	8502.05	4012.16	559.03	262.94	50.00	99.68
79		5.01	DOWN	144100.61	31458.04	2866.39	245.18	29.74	0.81	0.00	0.00	50.10	
			BETA	1.08	2.67	10.88	61.45	285.88	4953.28	99999.99	99999.99		
78.85	60.55	4.99	UP	155427.31	84007.71	31090.51	14974.49	8483.02	4045.75	578.28	282.03	50.04	99.75
80		4.99	DOWN	143872.22	31430.98	2905.63	249.82	31.66	1.51	0.00	0.00	50.04	
			BETA	1.08	2.67	10.70	59.94	267.94	2679.30	99999.99	99999.99		
79.84	60.57	5.00	UP	155399.92	84300.19	31309.48	15184.63	8585.62	4092.10	580.21	275.16	50.02	99.77
81		4.99	DOWN	143609.03	31521.76	2940.85	257.16	34.55	1.91	0.00	0.00	49.97	
			BETA	1.08	2.67	10.65	59.05	248.50	2142.46	99999.99	99999.99		
80.84	60.69	5.01	UP	155916.92	84551.73	31389.70	15194.14	8603.10	4097.69	554.45	261.69	49.82	99.83
82		5.02	DOWN	144102.64	31597.82	2957.39	268.90	36.94	0.81	0.00	0.00	50.08	
			BETA	1.08	2.68	10.61	56.50	232.89	5058.88	99999.99	99999.99		
81.84	60.45	5.00	UP	155243.27	84255.65	31249.64	15096.16	8561.40	4068.32	560.00	274.50	49.94	99.94
83		4.97	DOWN	143166.97	31859.22	2998.17	267.85	32.43	0.80	0.00	0.00	49.96	
			BETA	1.08	2.64	10.42	56.36	264.00	5085.40	99999.99	99999.99		
82.84	60.49	5.00	UP	155061.05	84106.89	31314.21	15135.78	8598.70	4116.31	579.32	281.55	50.09	100.00
84		5.02	DOWN	143930.95	31872.44	3003.00	262.22	32.83	0.91	0.00	0.00	50.03	
			BETA	1.08	2.64	10.43	57.72	261.92	4523.42	99999.99	99999.99		
83.84	60.38	4.98	UP	154735.00	84331.74	31562.45	15302.04	8637.95	4132.15	571.55	279.64	50.12	100.15
85		5.00	DOWN	143379.78	32068.62	3022.77	262.14	34.06	1.51	0.00	0.00	49.93	
			BETA	1.08	2.63	10.44	58.37	253.61	2736.52	99999.99	99999.99		
84.83	60.26	5.01	UP	155424.91	84715.69	31535.83	15244.11	8599.94	4085.60	565.76	271.22	49.83	100.33
86		5.00	DOWN	143629.97	32120.17	3089.42	272.15	38.29	1.31	0.10	0.00	49.98	
			BETA	1.08	2.64	10.21	56.01	224.60	3118.78	5657.60	99999.99		
85.83	60.38	4.99	UP	155193.66	84587.04	31627.20	15296.21	8681.12	4151.03	613.16	288.78	50.19	100.38
87		4.97	DOWN	143185.66	32331.78	3137.37	285.26	34.87	1.11	0.00	0.00	49.97	
			BETA	1.08	2.62	10.08	53.62	248.96	3739.67	99999.99	99999.99		
86.83	60.41	5.01	UP	156073.31	85441.50	31977.02	15452.68	8719.19	4113.00	574.32	277.64	50.13	100.35
88		5.00	DOWN	143823.37	32582.08	3138.02	281.70	37.73	0.91	0.00	0.00	49.97	
			BETA	1.09	2.62	10.19	54.86	231.09	4519.78	99999.99	99999.99		
87.83	60.40	5.00	UP	155679.78	84944.78	31577.55	15220.33	8617.08	4109.59	580.45	275.09	49.88	100.39
89		5.01	DOWN	144131.14	32679.26	3187.37	290.24	36.65	1.32	0.00	0.00	50.14	
			BETA	1.08	2.60	9.91	52.44	235.12	3113.33	99999.99	99999.99		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
88.82	60.13	5.00	UP	155818.08	85365.92	31828.22	15378.21	8716.27	4153.47	593.09	282.11	50.04	100.54
90		5.00	DOWN	143593.27	32462.82	3143.34	285.40	38.11	0.81	0.00	0.00	49.97	
			BETA	1.09	2.63	10.13	53.88	228.71	5127.74	99999.99	99999.99		
89.83	60.23	5.01	UP	156209.80	85813.31	32224.04	15587.15	8870.27	4220.41	606.75	288.66	50.45	100.43
91		5.03	DOWN	144338.17	32739.64	3219.80	294.77	40.54	1.63	0.00	0.00	49.81	
			BETA	1.08	2.62	10.01	52.88	218.80	2589.21	99999.99	99999.99		
90.83	59.88	4.99	UP	155448.75	85736.26	32322.83	15622.33	8844.57	4199.63	594.83	280.61	49.97	100.36
92		4.98	DOWN	143541.91	33073.35	3257.34	291.86	37.84	1.81	0.00	0.00	49.97	
			BETA	1.08	2.59	9.92	53.53	233.74	2320.24	99999.99	99999.99		
91.82	60.23	5.01	UP	156200.70	85814.40	32016.64	15406.76	8670.81	4144.56	583.62	278.16	49.94	100.37
93		4.98	DOWN	143687.95	32978.77	3211.33	291.23	36.63	1.21	0.00	0.00	49.98	
			BETA	1.09	2.60	9.97	52.90	236.71	3425.26	99999.99	99999.99		
92.82	60.42	5.00	UP	156040.12	85672.00	31892.11	15295.29	8627.68	4090.98	572.63	276.02	49.88	100.35
94		4.98	DOWN	143769.05	33040.19	3240.96	297.34	37.21	0.70	0.00	0.00	50.09	
			BETA	1.09	2.59	9.84	51.44	231.86	5844.26	99999.99	99999.99		
93.82	60.60	4.99	UP	155875.22	85549.11	31881.12	15344.35	8673.64	4133.56	582.30	275.17	49.89	100.40
95		5.01	DOWN	144266.92	33127.53	3233.42	304.10	38.82	1.21	0.00	0.00	49.97	
			BETA	1.08	2.58	9.86	50.46	223.43	3416.17	99999.99	99999.99		
94.81	60.32	4.99	UP	155526.12	85187.74	31529.91	15110.24	8476.22	3986.97	577.65	280.82	49.67	100.40
96		5.01	DOWN	144171.59	33068.32	3246.15	293.25	35.10	1.11	0.00	0.00	50.16	
			BETA	1.08	2.58	9.71	51.53	241.49	3591.86	99999.99	99999.99		
95.82	60.32	5.01	UP	156039.73	85505.97	31641.90	15187.96	8534.63	4030.66	553.91	251.80	49.64	100.44
97		5.00	DOWN	143927.03	32999.92	3251.77	300.93	40.83	1.41	0.00	0.00	49.98	
			BETA	1.08	2.59	9.73	50.47	209.03	2858.62	99999.99	99999.99		
96.82	60.39	5.02	UP	156386.25	85682.87	31814.78	15324.35	8639.43	4078.04	571.20	277.15	49.91	100.54
98		4.99	DOWN	144091.55	33252.09	3318.98	311.67	41.46	1.71	0.00	0.00	49.80	
			BETA	1.09	2.58	9.59	49.17	208.38	2384.82	99999.99	99999.99		
97.81	60.43	4.98	UP	155321.02	85615.45	31936.69	15401.86	8713.23	4129.53	574.03	271.01	49.97	100.62
99		5.00	DOWN	144072.39	33249.89	3353.45	309.28	40.15	0.91	0.00	0.00	50.00	
			BETA	1.08	2.57	9.52	49.80	217.02	4537.95	99999.99	99999.99		
98.80	60.17	5.00	UP	155868.34	86412.04	32484.22	15637.11	8866.97	4217.58	605.15	283.49	49.84	100.82
100		5.01	DOWN	144706.69	33664.79	3400.86	316.25	43.01	1.62	0.00	0.00	49.94	
			BETA	1.08	2.57	9.55	49.45	206.16	2603.44	99999.99	99999.99		
99.81	59.89	5.02	UP	156389.09	86922.67	33000.06	16051.09	9099.93	4363.88	618.97	290.45	49.94	101.11
101		5.01	DOWN	144566.66	33693.03	3437.94	326.76	44.20	1.62	0.00	0.00	50.17	
			BETA	1.08	2.58	9.60	49.12	205.88	2693.75	99999.99	99999.99		
100.80	60.03	5.00	UP	155767.06	86849.18	33053.57	15984.96	9084.61	4361.64	609.63	288.97	50.51	101.07
102		4.98	DOWN	144554.66	34597.25	3653.06	361.46	47.66	1.61	0.00	0.00	50.06	
			BETA	1.08	2.51	9.05	44.22	190.61	2709.09	99999.99	99999.99		
101.81	59.98	4.99	UP	155708.12	86317.13	32267.77	15534.21	8766.56	4156.12	585.81	278.69	49.84	101.15
103		5.03	DOWN	145621.12	34609.19	3618.18	359.34	49.56	1.93	0.00	0.00	49.97	
			BETA	1.07	2.49	8.92	43.23	176.89	2153.43	99999.99	99999.99		
102.80	59.86	5.01	UP	156234.55	87442.67	32991.03	15848.78	8943.26	4252.99	601.03	275.16	49.90	100.93
104		4.98	DOWN	144311.95	34305.81	3550.78	347.47	47.52	1.11	0.00	0.00	50.08	
			BETA	1.08	2.55	9.29	45.61	188.20	3831.52	99999.99	99999.99		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
103.80	60.14	5.01	UP	156369.00	87224.20	32754.95	15728.39	8857.08	4185.50	589.32	286.67	49.93	100.71
105		5.01	DOWN	145226.67	34506.74	3511.76	339.11	48.75	1.21	0.00	0.00	50.08	
			BETA	1.08	2.53	9.33	46.38	181.68	3459.09	99999.99	99999.99		
104.79	59.91	5.00	UP	156059.72	86760.72	32337.10	15395.70	8623.23	4101.36	567.14	260.86	50.12	100.62
106		5.02	DOWN	145253.55	34442.30	3533.96	334.84	43.27	2.23	0.10	0.00	49.71	
			BETA	1.07	2.52	9.15	45.98	199.29	1839.17	5671.40	99999.99		
105.80	59.79	5.00	UP	156078.33	86633.14	32269.87	15407.00	8648.55	4077.85	570.34	264.03	49.70	100.54
107		4.98	DOWN	144134.17	34244.66	3526.53	332.10	43.06	1.10	0.00	0.00	50.24	
			BETA	1.08	2.53	9.15	46.39	200.85	3707.14	99999.99	99999.99		
106.79	60.12	4.99	UP	155943.39	86905.41	32491.45	15545.74	8748.47	4128.36	585.49	276.16	49.87	100.54
108		4.98	DOWN	144594.25	34491.12	3504.91	330.02	45.59	1.81	0.00	0.00	49.98	
			BETA	1.08	2.52	9.27	47.11	191.89	2280.86	99999.99	99999.99		
107.79	60.29	4.98	UP	155823.55	86631.92	32226.95	15371.55	8648.31	4067.07	597.79	282.32	49.69	100.49
109		5.00	DOWN	144536.37	34463.83	3514.86	337.25	44.37	1.61	0.00	0.00	49.75	
			BETA	1.08	2.51	9.17	45.58	194.91	2526.13	99999.99	99999.99		
108.78	60.27	5.01	UP	156107.94	86633.59	32326.80	15425.96	8645.84	4068.76	579.35	276.09	49.96	100.57
110		4.99	DOWN	144437.72	34616.44	3554.45	335.21	48.28	1.41	0.00	0.00	50.02	
			BETA	1.08	2.50	9.09	46.02	179.08	2885.65	99999.99	99999.99		
109.79	60.28	4.99	UP	155762.61	86683.62	32450.62	15562.89	8749.99	4160.43	570.04	275.40	50.43	100.61
111		5.01	DOWN	144807.69	34674.53	3548.32	337.40	43.41	1.21	0.10	0.10	49.96	
			BETA	1.08	2.50	9.15	46.13	201.57	3438.37	5700.40	2754.00		
110.78	60.18	4.99	UP	156144.00	86770.03	32314.85	15440.22	8696.97	4132.79	583.04	270.55	50.01	100.65
112		5.00	DOWN	144616.28	34583.65	3565.33	332.34	44.00	2.12	0.00	0.00	50.18	
			BETA	1.08	2.51	9.06	46.46	197.66	1949.43	99999.99	99999.99		
111.79	60.30	5.00	UP	156134.84	86760.19	32210.95	15323.72	8612.25	4083.39	568.09	265.49	50.02	100.65
113		5.00	DOWN	144559.28	34766.78	3592.72	332.88	43.11	1.41	0.00	0.00	50.31	
			BETA	1.08	2.50	8.97	46.03	199.77	2896.02	99999.99	99999.99		
112.78	60.12	5.02	UP	156977.75	87538.38	32689.79	15703.21	8821.99	4160.87	573.15	275.78	50.12	100.71
114		4.99	DOWN	144504.86	34868.93	3616.69	339.90	46.18	1.51	0.00	0.00	49.97	
			BETA	1.09	2.51	9.04	46.20	191.03	2755.54	99999.99	99999.99		
113.78	60.20	4.99	UP	155855.28	87707.18	33326.24	16036.57	9061.20	4292.10	601.67	283.54	50.10	100.46
115		4.98	DOWN	144503.16	35317.97	3743.92	356.56	47.28	1.51	0.00	0.00	49.89	
			BETA	1.08	2.48	8.90	44.98	191.65	2842.45	99999.99	99999.99		
114.78	60.57	5.02	UP	156994.97	87883.23	32876.37	15703.82	8858.62	4196.79	589.29	283.75	50.38	100.35
116		5.00	DOWN	144874.69	35328.28	3713.31	360.49	49.94	1.41	0.00	0.00	49.92	
			BETA	1.08	2.49	8.85	43.56	177.39	2976.45	99999.99	99999.99		
115.77	60.63	4.99	UP	156236.08	87344.65	32496.71	15481.97	8691.89	4103.04	582.42	282.80	50.38	100.22
117		5.01	DOWN	145221.56	35391.94	3722.59	367.87	52.29	2.12	0.00	0.00	50.00	
			BETA	1.08	2.47	8.73	42.09	166.22	1935.40	99999.99	99999.99		
116.78	60.55	4.99	UP	155905.86	87283.57	32601.58	15537.01	8720.58	4128.87	569.70	268.52	49.68	100.18
118		5.01	DOWN	145298.12	35417.78	3716.54	358.90	47.91	1.82	0.00	0.00	49.94	
			BETA	1.07	2.46	8.77	43.29	182.02	2268.61	99999.99	99999.99		
117.77	60.51	5.01	UP	156924.47	87636.53	32558.55	15505.85	8730.95	4121.73	603.14	285.17	49.87	100.12
119		5.00	DOWN	145212.94	35419.11	3713.79	360.22	47.38	1.01	0.00	0.00	49.80	
			BETA	1.08	2.47	8.77	43.05	184.28	4080.92	99999.99	99999.99		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
118.77	60.40	4.99	UP	156386.41	87469.66	32467.76	15432.81	8652.46	4087.97	572.59	282.16	50.04	100.11
120		5.00	DOWN	145171.86	35500.36	3755.70	370.46	52.62	1.72	0.00	0.00	49.99	
			BETA	1.08	2.46	8.64	41.66	164.43	2376.73	99999.99	99999.99		
119.76	60.42	5.00	UP	156683.62	87641.70	32562.39	15472.06	8682.11	4120.67	578.56	272.87	50.02	100.07
121		5.00	DOWN	145126.19	35588.53	3742.06	368.32	49.51	2.12	0.00	0.00	50.05	
			BETA	1.08	2.46	8.70	42.01	175.36	1943.71	99999.99	99999.99		
120.77	60.48	5.01	UP	156868.06	87830.74	32606.85	15513.47	8688.96	4087.24	584.24	274.02	50.05	100.11
122		5.00	DOWN	145308.53	35628.76	3787.89	363.47	49.17	1.62	0.10	0.00	50.32	
			BETA	1.08	2.47	8.61	42.68	176.71	2522.99	5842.40	99999.99		
121.76	60.42	5.00	UP	156941.19	87702.09	32631.73	15529.42	8664.43	4084.06	564.54	275.91	49.88	100.14
123		4.99	DOWN	145114.94	35617.10	3776.00	368.23	49.25	1.81	0.10	0.00	49.94	
			BETA	1.08	2.46	8.64	42.17	175.93	2256.39	5645.40	99999.99		
122.77	60.72	4.99	UP	156764.09	88031.85	32783.55	15580.63	8737.02	4129.49	567.34	268.50	50.30	100.18
124		5.00	DOWN	145389.94	35680.13	3797.54	378.87	47.41	1.52	0.00	0.00	49.75	
			BETA	1.08	2.47	8.63	41.12	184.29	2716.77	99999.99	99999.99		
123.76	60.60	5.01	UP	157325.87	88341.40	32871.26	15584.35	8716.50	4102.70	564.42	261.32	49.86	100.21
125		5.02	DOWN	145876.69	35912.39	3839.53	377.57	53.71	1.93	0.00	0.00	49.92	
			BETA	1.08	2.46	8.56	41.28	162.29	2125.75	99999.99	99999.99		
124.76	60.39	4.99	UP	156640.30	87956.90	32721.95	15513.02	8694.89	4121.79	578.90	277.12	50.04	100.31
126		4.98	DOWN	144942.97	35832.13	3840.09	380.21	51.27	1.71	0.00	0.00	50.07	
			BETA	1.08	2.45	8.52	40.80	169.59	2410.40	99999.99	99999.99		
125.77	60.53	5.00	UP	156943.03	88167.21	32800.36	15529.81	8681.98	4112.72	567.02	267.00	50.33	100.41
127		5.01	DOWN	145604.22	36023.93	3920.04	391.61	55.83	1.72	0.00	0.00	50.41	
			BETA	1.08	2.45	8.37	39.66	155.51	2391.12	99999.99	99999.99		
126.76	60.48	5.00	UP	156982.73	88440.02	33057.40	15662.75	8792.26	4133.07	565.66	270.47	49.82	100.53
128		5.01	DOWN	145979.95	36337.04	3976.82	397.10	56.27	1.42	0.00	0.00	50.09	
			BETA	1.08	2.43	8.31	39.44	156.25	2910.61	99999.99	99999.99		
127.75	60.36	5.00	UP	157230.94	88918.22	33116.81	15669.76	8761.89	4115.20	579.52	271.66	49.95	100.65
129		4.99	DOWN	145205.62	36246.32	3938.09	396.80	55.67	1.41	0.00	0.00	50.19	
			BETA	1.08	2.45	8.41	39.49	157.39	2918.58	99999.99	99999.99		
128.76	60.47	4.99	UP	156917.95	88721.04	33180.38	15770.17	8820.90	4176.60	572.82	266.15	49.95	100.89
130		5.01	DOWN	146059.25	36787.41	4063.92	416.73	62.00	2.83	0.00	0.00	49.88	
			BETA	1.07	2.41	8.16	37.84	142.27	1475.83	99999.99	99999.99		
129.75	60.19	5.01	UP	157489.81	89305.08	33551.93	15962.91	8960.96	4199.13	601.68	282.92	49.98	101.14
131		5.01	DOWN	146094.98	37077.88	4099.27	414.02	56.69	1.92	0.00	0.00	49.98	
			BETA	1.08	2.41	8.18	38.56	158.07	2187.05	99999.99	99999.99		
130.75	59.79	4.99	UP	156975.27	89343.91	33653.29	16013.56	9011.43	4258.51	610.73	289.29	50.14	101.54
132		4.98	DOWN	145907.19	37389.05	4271.48	450.00	62.62	2.21	0.00	0.00	49.98	
			BETA	1.08	2.39	7.88	35.59	143.91	1926.93	99999.99	99999.99		
131.74	60.09	5.01	UP	157430.81	90685.17	34624.17	16515.61	9263.60	4371.15	619.11	289.72	50.10	101.28
133		5.00	DOWN	146771.20	38248.01	4466.84	472.78	70.34	3.03	0.00	0.00	49.97	
			BETA	1.07	2.37	7.75	34.93	131.70	1442.62	99999.99	99999.99		
132.75	60.25	5.00	UP	157500.95	90528.04	34333.74	16224.44	9070.00	4294.28	613.38	292.05	50.41	101.03
134		5.00	DOWN	146644.61	38011.64	4329.15	440.56	62.35	2.42	0.00	0.00	50.08	
			BETA	1.07	2.38	7.93	36.83	145.47	1774.50	99999.99	99999.99		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
133.74	60.27	5.00	UP	157258.23	89913.68	33706.78	15922.63	8923.46	4180.15	584.85	272.85	50.01	100.87
135		4.98	DOWN	146047.98	37586.07	4174.99	421.13	57.19	1.11	0.00	0.00	49.95	
			BETA	1.08	2.39	8.07	37.81	156.03	3765.90	99999.99	99999.99		
134.74	60.25	5.01	UP	157476.47	89842.84	33659.37	15955.77	8918.85	4194.16	591.98	280.32	49.95	100.78
136		5.02	DOWN	146893.83	37420.66	4154.52	421.59	54.71	1.72	0.00	0.00	49.97	
			BETA	1.07	2.40	8.10	37.85	163.02	2438.47	99999.99	99999.99		
135.74	60.19	5.00	UP	157582.52	89639.37	33396.11	15732.95	8778.21	4118.65	602.93	284.62	50.13	100.69
137		5.00	DOWN	146366.86	37307.09	4104.21	407.94	60.48	2.63	0.00	0.00	49.98	
			BETA	1.08	2.40	8.14	38.57	145.14	1566.03	99999.99	99999.99		
136.74	60.22	4.98	UP	156462.78	88848.15	33023.81	15558.95	8668.32	4086.60	568.55	266.27	49.81	100.67
138		4.99	DOWN	145969.84	37114.33	4102.26	412.68	57.59	2.11	0.00	0.00	49.96	
			BETA	1.07	2.39	8.05	37.70	150.52	1936.78	99999.99	99999.99		
137.74	60.38	5.01	UP	157616.39	89570.99	33211.58	15633.44	8719.40	4101.04	563.33	268.06	50.20	100.65
139		5.01	DOWN	146354.33	37125.41	4136.03	420.00	59.78	2.23	0.00	0.00	49.98	
			BETA	1.08	2.41	8.03	37.22	145.86	1839.03	99999.99	99999.99		
138.73	60.45	5.01	UP	157056.80	89238.16	33196.82	15711.50	8735.79	4077.88	552.77	257.66	50.26	100.82
140		4.99	DOWN	145808.05	37014.92	4095.33	422.81	59.37	1.61	0.00	0.00	49.96	
			BETA	1.08	2.41	8.11	37.16	147.14	2532.84	99999.99	99999.99		
139.73	60.35	5.01	UP	157741.75	90367.15	34211.03	16289.72	9107.78	4310.84	591.72	287.16	50.21	100.50
141		5.00	DOWN	146416.89	37227.44	4151.56	421.49	61.09	2.02	0.00	0.00	50.04	
			BETA	1.08	2.43	8.24	38.65	149.09	2134.08	99999.99	99999.99		
140.73	60.51	4.99	UP	157153.37	90106.09	33932.36	16046.47	8966.12	4260.36	597.45	283.76	49.80	100.11
142		5.01	DOWN	146916.81	37728.70	4217.59	437.61	60.93	2.33	0.00	0.00	50.09	
			BETA	1.07	2.39	8.05	36.67	147.15	1828.48	99999.99	99999.99		
141.74	60.19	5.00	UP	157273.55	89986.76	33742.15	15933.79	8918.51	4220.87	616.59	295.58	49.80	99.79
143		5.02	DOWN	147148.12	37900.78	4337.00	459.60	60.60	2.53	0.00	0.00	49.96	
			BETA	1.07	2.37	7.78	34.67	147.17	1668.33	99999.99	99999.99		
142.73	60.22	5.00	UP	157552.83	90338.53	34119.12	16201.91	9063.14	4307.80	639.03	313.41	50.00	99.49
144		5.02	DOWN	147448.11	38316.06	4441.39	458.11	65.04	1.92	0.00	0.00	49.96	
			BETA	1.07	2.36	7.68	35.37	139.35	2243.65	99999.99	99999.99		
143.72	60.30	5.02	UP	158191.27	90803.15	34092.26	16053.48	8956.61	4242.29	599.72	287.19	49.63	99.36
145		4.98	DOWN	146680.52	38561.84	4497.54	467.71	65.34	2.31	0.00	0.00	49.91	
			BETA	1.08	2.35	7.58	34.32	137.08	1836.49	99999.99	99999.99		
144.73	60.70	4.98	UP	157103.19	90121.38	33776.62	15935.45	8936.03	4239.46	611.69	286.02	50.29	99.29
146		5.00	DOWN	147067.14	38429.05	4400.35	457.20	66.84	2.82	0.00	0.00	49.99	
			BETA	1.07	2.35	7.68	34.85	133.69	1503.35	99999.99	99999.99		
145.72	60.78	4.99	UP	157187.66	90384.89	33978.89	16042.26	8967.96	4263.07	621.13	288.08	49.82	99.34
147		5.01	DOWN	147258.83	38474.60	4412.83	458.31	69.37	2.22	0.00	0.00	49.97	
			BETA	1.07	2.35	7.70	35.00	129.28	1920.30	99999.99	99999.99		
146.72	60.77	5.02	UP	158147.44	90813.82	34043.19	16063.78	8979.47	4252.61	603.32	289.45	49.97	99.35
148		5.00	DOWN	146814.89	38249.40	4312.55	442.55	62.89	1.82	0.00	0.00	49.97	
			BETA	1.08	2.37	7.89	36.30	142.78	2336.60	99999.99	99999.99		
147.71	60.74	4.98	UP	156795.05	89974.67	33744.65	15924.88	8911.59	4211.41	593.63	278.37	50.24	99.46
149		5.00	DOWN	146806.75	38337.86	4345.85	446.29	60.90	1.82	0.00	0.00	50.15	
			BETA	1.07	2.35	7.76	35.68	146.33	2313.96	99999.99	99999.99		

P/N:	FS1006	Test No.:	MUL00474	Page #	12
ID:	FL12-1196	Test Date:	8/1/12		

Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
148.72	60.64	5.00	UP	157499.66	90382.29	33974.04	16022.72	8941.24	4213.61	594.78	284.65	50.08	99.49
150		5.01	DOWN	146525.36	38088.48	4315.11	444.31	63.11	1.82	0.00	0.00	50.20	
			BETA	1.07	2.37	7.87	36.06	141.68	2315.17	99999.99	99999.99		
149.71	60.69	5.00	UP	157336.06	90120.83	33788.76	15893.97	8895.56	4193.85	596.99	289.11	50.17	99.55
151		4.99	DOWN	146254.34	38261.33	4332.15	438.98	59.42	1.81	0.00	0.00	50.02	
			BETA	1.08	2.36	7.80	36.21	149.71	2317.04	99999.99	99999.99		
150.72	60.69	5.00	UP	157056.78	90072.10	33828.66	15926.80	8904.84	4190.63	595.79	288.92	49.84	99.58
152		5.03	DOWN	147014.34	38234.64	4328.02	446.53	61.72	2.03	0.00	0.00	50.09	
			BETA	1.07	2.36	7.82	35.67	144.28	2064.35	99999.99	99999.99		
151.71	60.19	5.00	UP	157258.02	90373.08	34012.76	16041.65	8955.02	4204.96	597.80	286.58	50.04	99.71
153		4.98	DOWN	145885.50	38351.84	4366.70	451.78	63.51	2.21	0.00	0.00	49.98	
			BETA	1.08	2.36	7.79	35.51	141.00	1902.70	99999.99	99999.99		
152.70	60.39	5.00	UP	157193.95	90224.17	33849.26	15996.11	8934.64	4189.21	583.57	282.45	50.17	99.74
154		5.01	DOWN	146331.55	38228.91	4395.02	459.16	66.83	2.32	0.00	0.00	49.98	
			BETA	1.07	2.36	7.70	34.84	133.69	1805.69	99999.99	99999.99		
153.71	60.49	5.01	UP	157671.91	90547.67	33943.03	15987.65	8904.51	4184.74	562.65	261.90	50.23	99.83
155		5.01	DOWN	146730.81	38364.94	4386.14	455.92	64.21	1.92	0.00	0.00	49.87	
			BETA	1.07	2.36	7.74	35.07	138.68	2179.55	99999.99	99999.99		
154.71	60.19	5.00	UP	157406.62	90507.00	34006.08	16029.11	8986.37	4222.19	596.19	281.84	50.14	99.93
156		4.99	DOWN	146193.64	38383.51	4392.28	473.19	68.25	1.92	0.00	0.00	50.24	
			BETA	1.08	2.36	7.74	33.87	131.67	2199.06	99999.99	99999.99		
155.71	60.35	4.99	UP	157341.69	90523.82	34025.15	15976.40	8903.50	4189.78	587.68	278.96	50.09	100.03
157		4.97	DOWN	145785.91	38471.66	4450.57	463.37	64.78	2.31	0.00	0.00	49.96	
			BETA	1.08	2.35	7.65	34.48	137.44	1813.76	99999.99	99999.99		
156.71	60.53	5.00	UP	157527.41	90681.18	34103.24	16009.24	8943.28	4216.89	580.80	275.00	49.92	100.20
158		5.00	DOWN	146764.89	38934.86	4555.87	472.89	65.41	2.02	0.00	0.00	50.10	
			BETA	1.07	2.33	7.49	33.85	136.73	2087.57	99999.99	99999.99		
157.70	60.07	5.00	UP	157424.09	90598.39	34013.07	15975.38	8892.17	4188.55	585.14	276.14	49.91	100.40
159		5.02	DOWN	146696.02	38693.73	4527.86	470.89	66.72	2.23	0.00	0.00	49.98	
			BETA	1.07	2.34	7.51	33.93	133.28	1878.27	99999.99	99999.99		
158.69	60.31	5.01	UP	157667.27	90952.05	34140.15	16019.55	8858.65	4168.67	568.82	276.17	49.66	100.60
160		5.01	DOWN	146688.02	39063.16	4649.49	496.23	69.75	2.73	0.00	0.00	49.99	
			BETA	1.07	2.33	7.34	32.28	127.01	1526.99	99999.99	99999.99		
159.70	60.20	4.99	UP	157412.48	91236.47	34408.41	16160.59	9023.01	4221.55	591.19	288.54	50.03	100.88
161		5.01	DOWN	147010.20	39399.03	4690.93	504.97	71.05	3.04	0.10	0.10	49.98	
			BETA	1.07	2.32	7.34	32.00	127.00	1388.67	5911.90	2885.40		
160.69	59.68	5.00	UP	157494.47	91283.65	34445.88	16124.70	8973.37	4207.67	582.45	289.46	50.62	101.22
162		4.99	DOWN	146653.95	39712.61	4771.88	504.22	72.66	2.52	0.00	0.00	49.99	
			BETA	1.07	2.30	7.22	31.98	123.50	1669.71	99999.99	99999.99		
161.70	59.89	4.99	UP	157085.83	91595.72	34658.89	16277.20	9083.03	4257.71	573.35	269.81	50.06	101.56
163		5.02	DOWN	147465.98	40149.29	4884.46	531.77	76.03	2.84	0.00	0.00	49.97	
			BETA	1.07	2.28	7.10	30.61	119.47	1499.19	99999.99	99999.99		
162.69	59.60	4.98	UP	157031.47	91758.85	34733.09	16202.66	8977.87	4224.22	583.52	279.70	50.20	101.95
164		4.97	DOWN	146449.09	40454.78	5031.32	553.61	83.67	3.61	0.10	0.00	49.98	
			BETA	1.07	2.27	6.90	29.27	107.30	1170.14	5835.20	99999.99		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
163.69	59.67	5.01	UP	158124.20	92572.27	35168.67	16414.54	9112.50	4242.01	583.25	272.66	49.84	102.38
165		4.98	DOWN	147331.67	41086.23	5194.65	584.15	88.71	2.51	0.00	0.00	50.04	
			BETA	1.07	2.25	6.77	28.10	102.72	1690.04	99999.99	99999.99		
164.68	59.80	5.00	UP	157981.64	92767.16	35138.01	16365.28	9059.87	4239.91	589.33	284.07	49.79	102.75
166		5.00	DOWN	147743.20	41521.27	5318.53	596.21	93.35	3.02	0.00	0.00	49.98	
			BETA	1.07	2.23	6.61	27.45	97.05	1403.94	99999.99	99999.99		
165.69	59.48	4.99	UP	157970.02	93138.57	35301.49	16385.42	9065.83	4222.67	588.03	272.19	49.84	103.14
167		5.00	DOWN	148057.39	41931.42	5391.41	610.33	89.59	3.23	0.00	0.00	49.97	
			BETA	1.07	2.22	6.55	26.85	101.19	1307.33	99999.99	99999.99		
166.69	59.09	5.00	UP	158379.70	93430.12	35545.76	16480.95	9070.54	4211.76	597.93	287.09	49.62	102.39
168		5.01	DOWN	148330.09	42173.76	5432.64	611.56	94.66	3.24	0.00	0.00	49.94	
			BETA	1.07	2.22	6.54	26.95	95.82	1299.93	99999.99	99999.99		
167.68	59.28	5.01	UP	158442.25	93814.67	35643.39	16589.58	9180.94	4275.78	595.17	272.92	50.37	101.95
169		4.99	DOWN	147652.72	41371.73	5163.57	573.98	84.11	3.22	0.00	0.00	49.98	
			BETA	1.07	2.27	6.90	28.90	109.15	1327.88	99999.99	99999.99		
168.68	59.52	5.00	UP	158523.97	93949.42	35851.90	16684.89	9170.86	4270.25	605.18	287.06	50.01	101.72
170		5.00	DOWN	147785.52	41165.13	5097.61	559.46	79.43	2.63	0.00	0.00	49.97	
			BETA	1.07	2.28	7.03	29.82	115.46	1623.67	99999.99	99999.99		
169.67	59.51	5.02	UP	158778.48	93435.84	35317.24	16438.78	9104.67	4276.44	594.30	277.00	49.80	101.55
171		4.98	DOWN	147042.52	40573.44	4984.90	540.27	76.92	1.81	0.00	0.00	49.92	
			BETA	1.08	2.30	7.08	30.43	118.37	2362.67	99999.99	99999.99		
170.68	59.78	4.99	UP	157806.05	92771.09	34953.31	16211.95	8987.94	4174.65	614.89	292.44	49.92	101.41
172		5.00	DOWN	146904.39	39997.00	4797.18	510.09	75.29	2.83	0.00	0.00	50.02	
			BETA	1.07	2.32	7.29	31.78	119.38	1475.14	99999.99	99999.99		
171.67	59.60	4.99	UP	157542.41	92376.73	34778.87	16261.58	9021.24	4229.64	607.76	285.81	50.05	101.28
173		5.02	DOWN	146609.77	39466.17	4715.23	518.79	78.71	1.92	0.00	0.00	50.04	
			BETA	1.07	2.34	7.38	31.35	114.61	2202.94	99999.99	99999.99		
172.68	59.67	4.99	UP	157796.89	92233.48	34936.42	16369.08	9112.75	4275.47	598.51	280.05	51.16	101.21
174		5.01	DOWN	146474.44	39335.21	4709.45	511.90	75.18	2.83	0.00	0.00	49.92	
			BETA	1.08	2.34	7.42	31.98	121.21	1510.77	99999.99	99999.99		
173.67	59.86	5.00	UP	158224.09	92242.94	34650.46	16099.55	8943.48	4215.74	596.10	292.40	49.90	101.11
175		5.04	DOWN	147106.64	39168.00	4661.01	500.67	71.55	2.65	0.00	0.00	50.13	
			BETA	1.08	2.36	7.43	32.16	125.00	1590.85	99999.99	99999.99		
174.67	59.53	5.01	UP	158517.23	92387.19	34818.91	16272.35	9057.01	4251.15	608.83	279.94	49.94	101.04
176		5.08	DOWN	147669.00	39041.28	4628.67	497.83	67.59	2.77	0.00	0.00	49.98	
			BETA	1.07	2.37	7.52	32.69	134.00	1534.71	99999.99	99999.99		
175.66	59.49	5.00	UP	157707.06	91837.42	34497.76	16119.73	8934.90	4174.18	586.85	276.49	50.04	101.02
177		5.03	DOWN	146497.28	38907.55	4641.06	493.58	72.27	2.24	0.00	0.00	49.96	
			BETA	1.08	2.36	7.43	32.66	123.63	1863.47	99999.99	99999.99		
176.67	59.56	5.02	UP	158435.62	92201.06	34786.73	16235.04	9017.09	4230.37	607.37	287.65	50.25	101.02
178		5.03	DOWN	146463.83	38775.80	4657.36	505.02	74.76	2.95	0.00	0.00	50.45	
			BETA	1.08	2.38	7.47	32.15	120.61	1434.02	99999.99	99999.99		
177.67	59.82	5.00	UP	158112.41	92220.32	34852.80	16351.19	9074.28	4239.89	590.66	281.78	50.57	101.49
179		5.01	DOWN	146181.67	38857.69	4661.37	498.43	70.21	2.42	0.00	0.00	49.97	
			BETA	1.08	2.37	7.48	32.81	129.24	1752.02	99999.99	99999.99		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
178.67	59.49	4.98	UP	156997.97	91399.72	34496.14	16058.93	8920.70	4179.02	596.40	290.92	50.09	100.98
180		5.04	DOWN	146575.36	39077.71	4784.42	520.09	75.93	2.44	0.00	0.00	49.95	
			BETA	1.07	2.34	7.21	30.88	117.49	1712.71	99999.99	99999.99		
179.66	59.78	5.02	UP	158241.06	92499.94	35052.46	16421.11	9110.28	4283.75	606.02	289.45	49.91	100.56
181		4.99	DOWN	145963.87	39274.11	4767.56	515.65	76.52	1.81	0.00	0.00	50.06	
			BETA	1.08	2.36	7.35	31.85	119.06	2366.71	99999.99	99999.99		
180.66	60.09	5.01	UP	158314.77	92589.60	35120.04	16411.97	9110.13	4246.11	604.85	285.28	50.26	100.17
182		5.04	DOWN	147550.91	40050.34	4967.46	547.54	82.16	2.85	0.00	0.00	49.96	
			BETA	1.07	2.31	7.07	29.97	110.88	1489.86	99999.99	99999.99		
181.66	59.73	4.99	UP	157519.62	92516.04	35145.32	16387.82	9065.20	4262.67	593.96	288.26	49.82	99.91
183		5.02	DOWN	147008.59	40307.71	5070.40	570.15	86.55	3.94	0.00	0.00	50.03	
			BETA	1.07	2.30	6.93	28.74	104.74	1081.90	99999.99	99999.99		
182.65	60.25	5.00	UP	158069.00	92710.80	35013.02	16297.93	9019.73	4250.28	604.92	298.27	50.11	99.74
184		5.00	DOWN	147492.91	40939.19	5126.23	573.89	85.98	3.54	0.00	0.00	49.91	
			BETA	1.07	2.26	6.83	28.40	104.90	1200.64	99999.99	99999.99		
183.66	60.41	5.00	UP	158023.17	92804.12	35044.86	16281.40	9015.06	4222.17	601.62	284.65	50.04	99.73
185		5.00	DOWN	147647.53	40855.07	5093.08	562.78	82.69	3.53	0.00	0.00	49.87	
			BETA	1.07	2.27	6.88	28.93	109.02	1196.08	99999.99	99999.99		
184.65	60.33	4.99	UP	157655.89	92598.06	34922.15	16246.22	8990.39	4216.90	597.04	287.70	49.90	99.67
186		4.99	DOWN	147583.22	40971.74	5059.68	557.00	84.70	3.02	0.00	0.00	49.86	
			BETA	1.07	2.26	6.90	29.17	106.14	1396.32	99999.99	99999.99		
185.65	60.25	5.01	UP	158732.48	92982.80	35079.86	16331.68	9026.74	4267.57	597.46	278.95	50.05	99.63
187		5.07	DOWN	149129.58	40657.70	4968.45	546.28	75.84	3.07	0.00	0.00	49.99	
			BETA	1.06	2.29	7.06	29.90	119.02	1390.09	99999.99	99999.99		
186.64	60.37	4.98	UP	157251.31	92065.52	34694.57	16083.83	8892.38	4146.74	576.92	282.89	49.97	99.63
188		4.98	DOWN	147415.64	40652.86	5025.25	563.38	81.72	2.31	0.00	0.00	49.86	
			BETA	1.07	2.26	6.90	28.55	108.82	1795.13	99999.99	99999.99		
187.65	60.54	5.00	UP	158085.97	92491.18	34784.07	16226.41	8981.17	4197.17	572.47	277.29	49.98	99.66
189		5.03	DOWN	148578.06	40929.82	5068.71	551.68	81.05	3.45	0.10	0.00	49.97	
			BETA	1.06	2.26	6.86	29.41	110.81	1216.57	5724.70	99999.99		
188.64	60.31	5.01	UP	158133.95	92348.43	34847.80	16232.34	9015.08	4200.65	573.78	279.67	50.24	99.67
190		5.10	DOWN	149847.34	41058.48	5029.09	547.13	75.77	2.88	0.00	0.00	50.19	
			BETA	1.06	2.25	6.93	29.67	118.98	1458.56	99999.99	99999.99		
189.64	60.08	5.02	UP	158440.77	92464.69	34871.39	16236.23	9004.62	4207.59	593.60	280.65	49.95	99.73
191		5.08	DOWN	149896.52	41104.48	5052.55	546.15	81.06	2.46	0.00	0.00	49.97	
			BETA	1.06	2.25	6.90	29.73	111.09	1710.40	99999.99	99999.99		
190.63	60.38	4.99	UP	157636.20	92007.96	34683.38	16110.93	8918.23	4156.81	579.10	271.77	50.25	99.76
192		5.05	DOWN	149525.39	41549.88	5148.28	564.94	81.78	3.37	0.00	0.00	49.92	
			BETA	1.05	2.21	6.74	28.52	109.05	1233.47	99999.99	99999.99		
191.64	60.34	5.01	UP	157822.48	92025.03	34705.59	16147.28	8922.96	4147.25	583.42	284.54	49.93	99.82
193		5.05	DOWN	150068.67	41871.41	5186.54	569.19	85.97	2.25	0.00	0.00	49.60	
			BETA	1.05	2.20	6.69	28.37	103.79	1843.22	99999.99	99999.99		
192.63	60.11	4.98	UP	157248.12	91845.11	34646.89	16190.07	8976.83	4199.18	581.90	275.82	50.06	99.95
194		5.05	DOWN	150019.20	42010.46	5251.27	590.41	89.85	2.54	0.00	0.00	49.97	
			BETA	1.05	2.19	6.60	27.42	99.91	1653.22	99999.99	99999.99		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
193.64	60.57	5.01	UP	158216.92	92509.20	35022.12	16372.31	9030.25	4190.54	582.44	276.41	50.09	100.02
195		5.08	DOWN	151138.70	42451.23	5325.95	581.07	81.12	3.38	0.00	0.00	50.18	
			BETA	1.05	2.18	6.58	28.18	111.32	1239.80	99999.99	99999.99		
194.63	59.99	5.00	UP	158009.95	92274.26	34784.41	16138.19	8909.50	4146.34	562.59	265.34	50.25	100.14
196		5.09	DOWN	151190.70	42251.27	5258.26	582.21	89.06	3.19	0.00	0.00	50.08	
			BETA	1.05	2.18	6.62	27.72	100.04	1299.79	99999.99	99999.99		
195.62	60.13	5.00	UP	157983.36	92477.04	34944.93	16278.03	8976.04	4202.53	575.51	270.34	49.87	100.27
197		5.06	DOWN	150585.91	42281.56	5321.52	595.31	92.56	4.30	0.00	0.00	49.87	
			BETA	1.05	2.19	6.57	27.34	96.98	977.33	99999.99	99999.99		
196.63	60.07	4.98	UP	157679.47	92453.27	35066.56	16385.65	9047.17	4228.74	592.41	272.30	49.88	100.41
198		5.05	DOWN	149930.77	42185.35	5361.47	588.90	83.75	3.56	0.00	0.00	50.01	
			BETA	1.05	2.19	6.54	27.82	108.03	1187.85	99999.99	99999.99		
197.63	60.09	5.01	UP	158348.05	92641.83	34942.10	16228.01	8976.55	4207.62	594.18	280.20	50.17	100.60
199		5.07	DOWN	150341.34	42261.16	5410.16	603.40	85.92	3.38	0.00	0.00	49.98	
			BETA	1.05	2.19	6.46	26.89	104.48	1244.86	99999.99	99999.99		
198.62	59.84	5.00	UP	157856.77	92531.04	35071.64	16269.11	8995.09	4191.82	587.16	284.46	49.94	100.85
200		5.07	DOWN	150474.09	42621.64	5431.68	613.62	95.40	3.17	0.00	0.00	50.07	
			BETA	1.05	2.17	6.46	26.51	94.29	1322.34	99999.99	99999.99		
199.62	59.78	5.00	UP	158019.03	92913.02	35208.07	16407.13	9071.00	4260.56	610.47	293.52	49.56	101.34
201		5.07	DOWN	151490.37	43683.88	5690.85	661.66	100.98	3.48	0.00	0.00	50.10	
			BETA	1.04	2.13	6.19	24.80	89.83	1224.30	99999.99	99999.99		
200.62	59.54	5.01	UP	158414.80	93821.31	35802.01	16634.05	9186.57	4275.74	599.61	285.60	49.99	101.56
202		5.06	DOWN	151282.91	44578.78	6075.02	739.00	114.75	3.68	0.00	0.00	50.51	
			BETA	1.05	2.10	5.89	22.51	80.06	1161.89	99999.99	99999.99		
201.62	59.54	4.99	UP	158111.42	94068.18	35639.68	16360.62	8938.95	4139.19	593.44	284.43	49.81	100.80
203		5.10	DOWN	153141.78	45754.42	6318.95	789.33	120.71	4.84	0.00	0.00	49.99	
			BETA	1.03	2.06	5.64	20.73	74.05	855.20	99999.99	99999.99		
202.61	59.65	5.00	UP	158610.80	94492.54	36169.44	16711.84	9191.63	4260.31	628.18	301.21	49.60	100.21
204		5.06	DOWN	151631.08	44614.80	5907.71	690.34	102.27	3.88	0.00	0.00	49.97	
			BETA	1.05	2.12	6.12	24.21	89.88	1098.02	99999.99	99999.99		
203.62	60.07	5.00	UP	158290.72	94453.27	36064.51	16661.97	9186.72	4322.63	612.52	288.57	50.18	99.77
205		5.03	DOWN	151510.28	45209.84	6055.82	721.61	111.70	3.76	0.00	0.00	49.83	
			BETA	1.04	2.09	5.96	23.09	82.24	1149.64	99999.99	99999.99		
204.61	60.05	5.01	UP	159117.98	94925.48	36253.09	16810.18	9254.46	4316.07	610.98	295.67	50.10	99.36
206		5.01	DOWN	151076.95	45117.45	6089.23	718.03	115.14	4.86	0.00	0.00	49.98	
			BETA	1.05	2.10	5.95	23.41	80.38	888.08	99999.99	99999.99		
205.61	60.44	5.00	UP	158517.25	94833.78	36230.71	16742.61	9197.34	4298.10	605.29	294.16	49.63	99.05
207		5.02	DOWN	151782.19	45492.28	6125.67	723.28	104.83	3.55	0.00	0.00	49.98	
			BETA	1.04	2.08	5.91	23.15	87.74	1210.73	99999.99	99999.99		
206.62	60.73	5.01	UP	158310.11	94462.57	35899.13	16567.60	9143.64	4274.37	600.34	283.82	49.87	98.69
208		5.06	DOWN	152594.47	45653.45	6157.10	722.38	106.32	3.67	0.00	0.00	50.19	
			BETA	1.04	2.07	5.83	22.93	86.00	1164.68	99999.99	99999.99		
207.61	60.71	5.01	UP	158657.52	94971.48	36253.72	16723.73	9166.12	4267.52	606.31	284.95	50.43	98.41
209		5.04	DOWN	152070.62	45324.17	6076.79	709.15	112.21	4.88	0.00	0.00	49.86	
			BETA	1.04	2.10	5.97	23.58	81.69	874.49	99999.99	99999.99		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
208.60	60.66	5.00	UP	158371.97	94884.43	36278.26	16764.36	9248.73	4323.28	598.65	281.62	49.70	98.15
210		5.12	DOWN	154015.06	45641.72	6081.50	696.43	104.41	4.24	0.00	0.00	49.99	
			BETA	1.03	2.08	5.97	24.07	88.58	1019.64	99999.99	99999.99		
209.61	61.02	4.98	UP	157819.87	94378.38	36027.75	16645.86	9174.69	4278.94	611.69	299.91	49.89	97.99
211		5.10	DOWN	153747.25	45685.00	6078.08	705.25	111.64	3.19	0.00	0.00	49.86	
			BETA	1.03	2.07	5.93	23.60	82.18	1341.36	99999.99	99999.99		
210.60	60.66	5.01	UP	158600.27	94721.63	36071.81	16611.61	9126.53	4250.15	612.07	289.28	49.66	97.94
212		5.13	DOWN	153979.41	45154.01	5921.32	672.30	103.80	3.31	0.00	0.00	49.97	
			BETA	1.03	2.10	6.09	24.71	87.92	1284.03	99999.99	99999.99		
211.60	60.89	4.99	UP	158012.52	94272.34	35824.44	16553.22	9120.74	4239.57	588.49	276.96	50.22	97.90
213		5.10	DOWN	153490.67	44875.90	5877.16	688.90	102.86	2.88	0.00	0.00	50.02	
			BETA	1.03	2.10	6.10	24.03	88.67	1472.07	99999.99	99999.99		
212.59	60.85	5.01	UP	157550.19	93741.72	35628.39	16530.67	9102.81	4219.02	579.97	266.61	48.26	97.89
214		5.12	DOWN	153293.80	44328.68	5698.74	654.28	95.08	3.00	0.00	0.00	49.98	
			BETA	1.03	2.11	6.25	25.27	95.74	1406.34	99999.99	99999.99		
213.60	61.00	5.00	UP	157133.94	93170.39	35360.60	16351.84	9037.47	4205.66	591.78	278.15	49.68	97.93
215		5.14	DOWN	154091.02	44427.08	5738.53	654.13	102.24	3.74	0.00	0.00	49.96	
			BETA	1.02	2.10	6.16	25.00	88.39	1124.51	99999.99	99999.99		
214.59	60.86	5.00	UP	156017.89	92267.80	35121.46	16313.08	9031.33	4173.55	596.28	272.02	50.31	97.95
216		5.14	DOWN	153433.08	43961.67	5617.25	645.69	97.79	3.63	0.00	0.00	49.97	
			BETA	1.02	2.10	6.25	25.26	92.35	1149.74	99999.99	99999.99		
215.59	60.99	5.00	UP	157302.81	93048.13	35303.74	16333.06	8992.45	4189.84	570.81	267.22	49.55	97.95
217		5.19	DOWN	155241.23	44265.66	5680.71	650.98	93.36	4.31	0.00	0.00	49.86	
			BETA	1.01	2.10	6.21	25.09	96.32	972.12	99999.99	99999.99		
216.58	60.73	5.00	UP	157252.77	92877.69	35271.40	16337.63	9025.82	4198.43	587.25	278.46	49.79	97.98
218		5.18	DOWN	153885.66	43476.39	5560.58	630.71	93.73	2.72	0.00	0.00	49.94	
			BETA	1.02	2.14	6.34	25.90	96.30	1543.54	99999.99	99999.99		
217.59	60.94	4.99	UP	157256.77	92830.11	35215.74	16363.75	9031.06	4201.08	592.30	276.69	50.03	98.07
219		5.16	DOWN	153974.56	43768.84	5611.83	624.43	96.10	3.34	0.00	0.00	49.97	
			BETA	1.02	2.12	6.28	26.21	93.98	1257.81	99999.99	99999.99		
218.58	60.93	5.02	UP	158385.75	93300.57	35461.83	16510.45	9124.18	4241.21	596.75	279.56	50.18	98.16
220		5.17	DOWN	153927.05	43647.73	5595.08	640.32	101.06	4.49	0.10	0.10	49.92	
			BETA	1.03	2.14	6.34	25.78	90.28	944.59	5967.50	2795.60		
219.59	60.88	4.99	UP	157418.28	92677.47	35132.32	16294.26	8962.45	4151.68	577.01	268.77	50.08	98.25
221		5.20	DOWN	154487.91	43776.44	5655.65	645.19	89.29	3.25	0.00	0.00	50.39	
			BETA	1.02	2.12	6.21	25.25	100.37	1277.44	99999.99	99999.99		
220.58	60.79	4.99	UP	157516.56	92883.01	35227.84	16425.78	9087.07	4239.16	594.02	279.50	49.93	98.36
222		5.13	DOWN	152574.98	43556.83	5643.77	643.39	92.70	3.21	0.00	0.00	49.99	
			BETA	1.03	2.13	6.24	25.53	98.03	1320.61	99999.99	99999.99		
221.58	61.09	5.01	UP	157642.98	92983.20	35334.91	16440.81	9051.23	4178.99	575.57	273.74	49.86	98.49
223		5.15	DOWN	153447.81	44078.98	5771.79	665.13	98.20	4.06	0.00	0.00	50.07	
			BETA	1.03	2.11	6.12	24.72	92.17	1029.31	99999.99	99999.99		
222.57	60.37	4.99	UP	157453.47	93093.10	35502.02	16435.17	9059.15	4205.44	574.68	279.03	49.97	98.62
224		5.15	DOWN	153458.34	43947.15	5770.62	661.35	101.39	3.64	0.00	0.00	49.97	
			BETA	1.03	2.12	6.15	24.85	89.35	1155.34	99999.99	99999.99		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
223.58	60.86	4.98	UP	157105.16	92905.02	35312.35	16370.15	9033.52	4199.81	603.92	287.43	49.84	98.78
225		5.15	DOWN	153658.87	44292.67	5854.73	675.61	102.27	3.33	0.00	0.00	50.06	
			BETA	1.02	2.10	6.03	24.23	88.33	1261.20	99999.99	99999.99		
224.57	60.58	5.02	UP	158161.59	93739.20	35692.21	16582.35	9146.26	4276.06	617.03	290.68	49.77	98.90
226		5.18	DOWN	154330.20	44587.25	5937.51	688.17	101.30	4.08	0.21	0.10	49.91	
			BETA	1.02	2.10	6.01	24.10	90.29	1048.05	2938.24	2906.80		
225.58	60.33	5.01	UP	157737.03	93477.18	35753.89	16623.49	9183.13	4310.46	597.61	287.88	50.38	99.07
227		5.24	DOWN	155370.14	44420.07	5874.21	674.62	105.81	4.44	0.00	0.00	49.67	
			BETA	1.02	2.10	6.09	24.64	86.79	970.82	99999.99	99999.99		
226.57	60.29	4.99	UP	157303.59	93307.70	35574.60	16497.09	9065.33	4208.15	607.31	284.10	50.17	99.22
228		5.14	DOWN	153263.42	44550.53	5995.99	701.45	107.89	3.73	0.00	0.00	49.97	
			BETA	1.03	2.09	5.93	23.52	84.02	1128.19	99999.99	99999.99		
227.57	60.55	4.98	UP	156957.08	93245.01	35640.63	16507.23	9115.10	4257.49	585.45	279.46	50.30	99.34
229		5.17	DOWN	154338.19	45112.31	6068.58	729.40	116.24	4.70	0.00	0.00	49.86	
			BETA	1.02	2.07	5.87	22.63	78.42	905.85	99999.99	99999.99		
228.56	60.05	5.01	UP	157837.80	94021.05	35929.24	16630.90	9170.81	4278.30	593.08	284.11	50.07	99.53
230		5.26	DOWN	156249.94	45144.41	6060.27	719.91	107.86	3.61	0.00	0.00	50.08	
			BETA	1.01	2.08	5.93	23.10	85.03	1185.12	99999.99	99999.99		
229.57	60.06	5.01	UP	157793.42	93798.68	35792.14	16576.00	9121.12	4223.59	592.35	285.51	49.61	99.71
231		5.19	DOWN	154582.72	45273.47	6144.51	724.90	114.47	4.19	0.00	0.00	49.95	
			BETA	1.02	2.07	5.83	22.87	79.68	1008.02	99999.99	99999.99		
230.56	60.19	5.01	UP	158001.09	94131.96	36083.72	16671.61	9162.15	4308.59	608.24	293.20	49.99	99.89
232		5.20	DOWN	154979.14	45323.74	6126.30	733.73	109.55	3.78	0.00	0.00	49.97	
			BETA	1.02	2.08	5.89	22.72	83.63	1139.84	99999.99	99999.99		
231.56	59.96	4.99	UP	157685.73	94018.03	36013.85	16635.08	9133.46	4257.11	613.07	298.06	50.34	100.14
233		5.19	DOWN	154822.67	45561.46	6219.44	740.06	114.52	4.82	0.00	0.00	50.04	
			BETA	1.02	2.06	5.79	22.48	79.75	883.22	99999.99	99999.99		
232.55	59.87	5.01	UP	157814.17	94369.35	36241.75	16813.30	9237.51	4265.83	596.97	280.48	49.66	100.42
234		5.18	DOWN	155280.09	46333.71	6491.70	809.66	129.38	4.82	0.00	0.00	50.08	
			BETA	1.02	2.04	5.58	20.77	71.40	885.03	99999.99	99999.99		
233.56	59.81	5.00	UP	157361.69	94398.18	36287.72	16770.80	9217.26	4234.67	591.22	286.83	50.36	100.78
235		5.13	DOWN	154497.19	47190.79	6677.20	833.25	134.46	5.18	0.00	0.00	49.87	
			BETA	1.02	2.00	5.43	20.13	68.55	817.50	99999.99	99999.99		
234.55	59.99	4.99	UP	157364.27	94961.12	36777.83	16965.34	9245.45	4240.91	594.24	283.16	49.94	101.15
236		5.08	DOWN	153712.94	47907.74	6937.92	868.52	141.66	3.69	0.00	0.00	50.46	
			BETA	1.02	1.98	5.30	19.53	65.27	1149.30	99999.99	99999.99		
235.56	59.65	5.01	UP	158776.97	96282.68	37274.45	17130.20	9345.13	4265.90	602.10	285.01	50.57	101.56
237		5.08	DOWN	153782.52	48342.68	7104.75	886.34	143.54	5.43	0.00	0.00	49.97	
			BETA	1.03	1.99	5.25	19.33	65.10	785.62	99999.99	99999.99		
236.55	59.57	4.98	UP	158397.22	96438.56	37226.60	16933.29	9268.25	4286.55	599.91	290.03	50.33	101.95
238		5.14	DOWN	155810.56	49121.51	7247.60	922.10	148.96	6.95	0.00	0.00	50.02	
			BETA	1.02	1.96	5.14	18.36	62.22	616.77	99999.99	99999.99		
237.55	59.15	5.01	UP	159195.84	97138.87	37630.83	17187.41	9351.02	4287.58	606.16	292.09	50.26	102.40
239		5.04	DOWN	153831.62	49428.57	7400.82	953.00	162.89	7.64	0.10	0.10	49.97	
			BETA	1.03	1.97	5.08	18.04	57.41	561.20	6061.60	2920.90		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
238.54	59.49	4.99	UP	159012.92	97375.06	37836.25	17238.35	9346.41	4297.86	599.58	286.98	50.23	102.80
240		5.04	DOWN	153960.91	49875.86	7543.74	994.14	160.15	7.34	0.00	0.00	49.98	
			BETA	1.03	1.95	5.02	17.34	58.36	585.54	99999.99	99999.99		
239.55	59.08	4.99	UP	159634.03	98051.13	38018.95	17311.82	9364.21	4334.24	622.04	303.43	49.85	103.18
241		5.00	DOWN	152909.84	49972.10	7563.38	966.10	166.31	9.17	0.00	0.00	50.08	
			BETA	1.04	1.96	5.03	17.92	56.31	472.65	99999.99	99999.99		
240.54	59.41	4.99	UP	160408.20	98762.94	38199.24	17363.60	9434.67	4364.12	610.62	295.98	49.84	103.55
242		4.96	DOWN	153042.03	50875.26	7869.22	1027.09	171.23	8.72	0.00	0.00	49.97	
			BETA	1.05	1.94	4.85	16.91	55.10	500.47	99999.99	99999.99		
241.54	58.89	5.00	UP	159662.31	98256.15	38111.40	17211.43	9315.65	4285.40	598.77	289.51	50.00	103.92
243		4.94	DOWN	152731.23	50841.47	7896.31	1012.00	171.05	7.39	0.00	0.00	49.88	
			BETA	1.05	1.93	4.83	17.01	54.46	579.89	99999.99	99999.99		
242.54	58.94	5.01	UP	158568.20	97572.51	37814.31	17254.06	9353.07	4282.74	593.80	270.78	48.78	103.38
244		4.95	DOWN	152853.84	50907.07	7840.38	1034.66	175.69	7.70	0.00	0.00	49.97	
			BETA	1.04	1.92	4.82	16.68	53.24	556.20	99999.99	99999.99		
243.54	58.90	5.00	UP	158826.09	97579.80	37787.59	17182.19	9288.08	4277.19	594.09	282.24	49.79	102.76
245		4.93	DOWN	151756.55	49479.71	7339.37	936.87	156.08	6.28	0.30	0.10	50.10	
			BETA	1.05	1.97	5.15	18.34	59.51	681.08	1980.30	2822.40		
244.53	59.11	5.00	UP	159071.06	97763.57	38091.24	17519.38	9555.41	4401.66	614.71	290.95	50.22	102.38
246		4.94	DOWN	151974.67	49179.32	7233.12	914.96	143.87	7.39	0.00	0.00	49.90	
			BETA	1.05	1.99	5.27	19.15	66.42	595.62	99999.99	99999.99		
245.54	59.29	4.99	UP	158775.69	96799.79	37419.41	17144.72	9329.39	4348.50	605.78	287.48	49.89	102.17
247		4.93	DOWN	150864.37	47931.14	6956.66	861.39	136.57	4.77	0.00	0.00	49.95	
			BETA	1.05	2.02	5.38	19.90	68.31	911.64	99999.99	99999.99		
246.53	59.74	5.00	UP	158326.92	95909.37	36935.38	16986.39	9281.82	4297.23	603.35	284.42	49.19	102.00
248		4.89	DOWN	149394.34	46869.87	6681.50	793.74	121.54	4.74	0.00	0.00	49.99	
			BETA	1.06	2.05	5.53	21.40	76.37	906.59	99999.99	99999.99		
247.53	59.81	4.99	UP	157361.95	94862.28	36364.74	16677.03	9109.10	4193.58	581.35	287.61	49.05	101.93
249		5.16	DOWN	155857.08	47615.15	6632.97	812.63	131.02	3.85	0.00	0.00	50.43	
			BETA	1.01	1.99	5.48	20.52	69.52	1089.24	99999.99	99999.99		
248.52	59.45	5.01	UP	158475.95	95109.49	36403.33	16840.58	9223.03	4280.36	603.19	284.99	49.09	101.91
250		5.11	DOWN	152166.41	44575.97	6049.04	730.60	112.73	4.55	0.00	0.00	49.97	
			BETA	1.04	2.13	6.02	23.05	81.82	940.74	99999.99	99999.99		
249.53	59.53	5.00	UP	157896.41	94326.35	36049.90	16561.95	9034.87	4184.32	579.98	273.97	49.88	101.90
251		4.98	DOWN	149892.70	45046.50	6203.81	740.85	117.31	5.23	0.00	0.00	50.08	
			BETA	1.05	2.09	5.81	22.36	77.02	800.06	99999.99	99999.99		
250.52	59.66	5.00	UP	158179.37	94375.86	36247.52	16795.09	9219.32	4295.03	602.58	290.48	50.06	101.89
252		5.01	DOWN	150368.77	44801.67	6175.78	742.66	116.36	5.36	0.00	0.00	49.99	
			BETA	1.05	2.11	5.87	22.61	79.23	801.31	99999.99	99999.99		
251.53	59.75	5.00	UP	157784.87	93743.47	35937.92	16603.28	9145.33	4240.53	603.02	286.78	49.36	101.89
253		5.00	DOWN	149674.55	44546.22	6132.19	735.61	107.97	4.74	0.00	0.00	49.98	
			BETA	1.05	2.10	5.86	22.57	84.70	894.63	99999.99	99999.99		
252.52	59.72	5.00	UP	158182.37	93883.48	35962.91	16614.39	9097.01	4225.88	597.13	284.79	50.26	101.90
254		5.01	DOWN	149847.69	44575.07	6094.07	727.49	113.58	5.46	0.00	0.00	49.98	
			BETA	1.06	2.11	5.90	22.84	80.09	773.97	99999.99	99999.99		

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ID: FL12-1196

Test No.: MUL00474
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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
253.52	59.41	5.01	UP	157914.34	93619.32	35990.13	16687.04	9148.52	4250.70	610.10	294.74	50.32	101.97
255		5.00	DOWN	149657.61	44168.01	6049.83	709.17	112.41	4.15	0.00	0.00	50.16	
			BETA	1.06	2.12	5.95	23.53	81.39	1024.27	99999.99	99999.99		
254.51	59.34	5.00	UP	157804.55	93300.61	35754.30	16577.57	9114.74	4236.57	582.07	270.08	49.90	102.26
256		4.99	DOWN	148989.77	44321.12	6114.94	762.61	118.55	4.63	0.00	0.00	50.19	
			BETA	1.06	2.11	5.85	21.74	76.89	915.03	99999.99	99999.99		
255.52	59.27	5.01	UP	158526.25	94357.47	36478.99	16913.08	9284.30	4344.54	608.47	293.87	49.90	101.73
257		4.99	DOWN	149374.77	45468.43	6602.53	836.00	133.89	5.53	0.00	0.00	50.11	
			BETA	1.06	2.08	5.53	20.23	69.34	785.63	99999.99	99999.99		
256.51	59.72	5.00	UP	158279.16	94332.32	36483.30	16849.93	9271.35	4299.96	602.89	294.48	50.35	101.32
258		5.02	DOWN	150448.37	45605.90	6505.91	819.10	133.46	4.77	0.00	0.00	50.06	
			BETA	1.05	2.07	5.61	20.57	69.47	901.46	99999.99	99999.99		
257.52	59.70	5.01	UP	158325.44	94587.39	36551.03	16934.39	9276.64	4325.64	620.41	295.93	50.26	101.03
259		5.00	DOWN	150186.80	46133.12	6662.44	831.96	135.87	4.24	0.00	0.00	50.19	
			BETA	1.05	2.05	5.49	20.35	68.28	1020.20	99999.99	99999.99		
258.51	59.97	5.01	UP	158865.53	94896.96	36573.21	16874.82	9259.16	4292.31	612.16	289.07	49.84	100.69
260		4.99	DOWN	150040.22	46334.96	6753.78	842.18	128.79	5.03	0.00	0.00	49.97	
			BETA	1.06	2.05	5.42	20.04	71.89	853.34	99999.99	99999.99		
259.51	60.13	4.99	UP	158197.81	94522.88	36346.10	16669.01	9101.34	4236.53	602.28	282.74	50.01	100.61
261		5.02	DOWN	150880.39	46391.59	6693.29	814.20	129.27	3.85	0.00	0.00	50.07	
			BETA	1.05	2.04	5.43	20.47	70.41	1100.40	99999.99	99999.99		
260.50	60.00	5.00	UP	157769.20	94503.01	36663.88	16940.96	9315.06	4339.61	623.91	297.51	49.71	100.56
262		4.99	DOWN	150176.09	45953.49	6568.85	794.54	126.49	5.14	0.00	0.00	49.97	
			BETA	1.05	2.06	5.58	21.32	73.64	844.28	99999.99	99999.99		
261.51	60.13	5.01	UP	157455.92	94096.44	36283.59	16743.00	9200.22	4262.99	588.74	279.50	50.10	100.47
263		5.01	DOWN	150097.73	45349.91	6398.09	778.45	121.35	5.97	0.00	0.00	50.09	
			BETA	1.05	2.07	5.67	21.51	75.82	714.07	99999.99	99999.99		
262.50	60.11	5.00	UP	157406.34	93839.41	36028.60	16622.89	9096.44	4194.68	584.51	277.70	50.02	100.51
264		4.99	DOWN	149488.45	45042.81	6345.61	769.95	122.16	5.44	0.00	0.00	49.96	
			BETA	1.05	2.08	5.68	21.59	74.46	771.08	99999.99	99999.99		
263.50	60.27	4.99	UP	157423.92	93410.45	35712.72	16431.28	8984.25	4187.40	597.26	285.09	49.82	100.54
265		4.99	DOWN	149241.23	44630.67	6263.89	759.22	116.75	3.83	0.10	0.10	50.09	
			BETA	1.05	2.09	5.70	21.64	76.95	1093.32	5972.60	2850.90		
264.49	60.27	5.01	UP	158085.58	93771.90	36021.64	16715.77	9175.39	4270.56	609.66	285.09	50.19	100.57
266		5.01	DOWN	149240.45	44178.52	6153.23	741.11	115.09	5.26	0.00	0.00	49.92	
			BETA	1.06	2.12	5.85	22.56	79.72	811.89	99999.99	99999.99		
265.50	60.31	5.00	UP	157172.52	93054.18	35803.80	16649.63	9176.72	4287.30	591.23	282.99	50.13	100.59
267		5.00	DOWN	149281.77	44272.74	6246.95	757.45	111.30	3.84	0.00	0.00	49.93	
			BETA	1.05	2.10	5.73	21.98	82.45	1116.48	99999.99	99999.99		
266.49	59.90	4.99	UP	157439.48	93294.88	36003.50	16746.21	9201.08	4270.56	613.08	296.81	49.95	100.62
268		5.01	DOWN	149191.30	44140.31	6192.21	754.59	118.44	4.04	0.00	0.00	49.91	
			BETA	1.06	2.11	5.81	22.19	77.69	1057.07	99999.99	99999.99		
267.50	60.05	5.01	UP	158012.81	93428.04	35949.65	16677.49	9180.83	4285.11	605.05	282.61	50.04	100.72
269		4.99	DOWN	148653.02	44062.22	6179.81	752.87	114.53	4.63	0.10	0.10	50.20	
			BETA	1.06	2.12	5.82	22.15	80.16	925.51	6050.50	2826.10		

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ID:	FL12-1196	Test Date:	8/1/12		

Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
268.49	60.12	5.00	UP	157489.86	93114.61	35823.25	16546.42	9078.45	4238.75	607.20	281.74	50.08	100.80
270		5.00	DOWN	148454.73	44033.96	6197.85	759.31	121.43	3.93	0.00	0.00	49.97	
			BETA	1.06	2.11	5.78	21.79	74.76	1078.56	99999.99	99999.99		
269.49	60.10	5.01	UP	157934.86	93459.86	36017.31	16741.30	9226.38	4273.88	597.90	275.63	49.76	100.83
271		5.03	DOWN	149194.42	44152.79	6238.86	761.30	118.85	4.67	0.00	0.00	50.08	
			BETA	1.06	2.12	5.77	21.99	77.63	915.18	99999.99	99999.99		
270.48	59.95	5.00	UP	157820.22	93362.45	36110.43	16775.08	9220.31	4282.13	609.61	287.25	50.00	100.94
272		5.00	DOWN	148753.48	44071.44	6231.83	754.83	111.50	3.74	0.00	0.00	50.61	
			BETA	1.06	2.12	5.79	22.22	82.69	1144.95	99999.99	99999.99		
271.49	59.82	5.00	UP	157743.45	93257.93	35897.12	16608.53	9109.12	4253.15	598.79	290.57	49.97	101.07
273		4.99	DOWN	148133.39	44162.97	6315.12	796.65	127.49	3.93	0.00	0.00	49.90	
			BETA	1.06	2.11	5.68	20.85	71.45	1082.23	99999.99	99999.99		
272.48	59.95	5.02	UP	158265.16	93655.98	36139.69	16705.83	9173.74	4270.83	617.32	300.46	49.97	100.85
274		4.99	DOWN	148844.86	44903.25	6521.72	810.49	130.21	6.14	0.00	0.00	50.15	
			BETA	1.06	2.09	5.54	20.61	70.45	695.57	99999.99	99999.99		
273.48	60.00	4.99	UP	157474.05	93519.24	36031.21	16702.79	9221.72	4290.94	592.91	277.67	49.78	100.77
275		5.01	DOWN	149118.61	44532.88	6363.58	782.88	120.16	3.75	0.00	0.00	50.35	
			BETA	1.06	2.10	5.66	21.34	76.75	1144.25	99999.99	99999.99		
274.48	59.99	5.01	UP	158076.94	93543.44	35970.48	16619.63	9179.91	4290.91	614.37	297.08	49.86	100.77
276		4.99	DOWN	148502.25	44215.26	6297.25	783.28	123.41	4.84	0.10	0.10	49.99	
			BETA	1.06	2.12	5.71	21.22	74.39	886.55	6143.70	2970.80		
275.48	60.02	4.99	UP	157664.81	93145.16	35752.48	16495.00	9047.59	4226.86	604.76	291.18	49.55	100.78
277		4.98	DOWN	147626.41	43662.83	6182.51	756.21	118.70	5.33	0.00	0.00	50.02	
			BETA	1.07	2.13	5.78	21.81	76.22	793.03	99999.99	99999.99		
276.48	60.24	5.00	UP	157728.39	93245.98	35903.62	16629.87	9150.05	4249.90	615.41	297.05	49.97	100.82
278		5.01	DOWN	148485.09	44048.46	6213.12	764.70	122.65	5.66	0.00	0.00	50.09	
			BETA	1.06	2.12	5.78	21.75	74.60	750.87	99999.99	99999.99		
277.47	60.15	5.03	UP	158405.98	93587.17	36158.20	16797.32	9231.87	4310.01	615.90	298.47	49.99	100.85
279		5.01	DOWN	148547.73	43917.86	6223.30	761.58	115.97	5.05	0.00	0.00	49.97	
			BETA	1.07	2.13	5.81	22.06	79.61	853.47	99999.99	99999.99		
278.48	60.14	4.96	UP	156202.27	92250.79	35605.05	16522.68	9072.71	4247.46	605.29	291.45	50.25	100.90
280		4.97	DOWN	147795.69	43967.09	6280.61	764.97	123.22	5.43	0.00	0.00	49.97	
			BETA	1.06	2.10	5.67	21.60	73.63	782.22	99999.99	99999.99		
279.47	60.27	5.01	UP	157824.41	93198.18	35942.54	16705.53	9192.59	4286.91	594.90	281.00	49.95	100.99
281		5.01	DOWN	148561.09	44236.80	6312.00	773.00	120.76	6.47	0.00	0.00	49.97	
			BETA	1.06	2.11	5.69	21.61	76.12	662.58	99999.99	99999.99		
280.47	60.20	4.99	UP	157421.34	92816.70	35657.99	16513.84	9051.06	4216.27	593.99	272.62	49.71	101.05
282		5.01	DOWN	148402.77	44179.64	6338.31	771.74	124.80	6.26	0.00	0.00	50.09	
			BETA	1.06	2.10	5.63	21.40	72.52	673.53	99999.99	99999.99		
281.46	59.94	5.00	UP	157543.95	93227.10	36089.83	16721.34	9203.43	4291.19	621.06	308.76	49.76	101.13
283		5.00	DOWN	148219.31	44098.74	6341.57	782.30	128.30	4.55	0.00	0.00	49.96	
			BETA	1.06	2.11	5.69	21.37	71.73	943.12	99999.99	99999.99		
282.47	60.05	5.01	UP	158127.98	93351.59	35971.59	16577.03	9093.42	4238.08	596.63	288.20	49.86	101.24
284		4.99	DOWN	147999.69	44350.65	6408.80	785.65	126.23	6.03	0.00	0.00	50.04	
			BETA	1.07	2.10	5.61	21.10	72.04	702.83	99999.99	99999.99		

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Particle Counts

[illegible]

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UNCLASSIFIED

APPENDIX F. ISO 19438 TEST RESULTS

Filter: FL12-1198, Detroit Diesel Power Guard 23530707

Vehicle: Heavy Tactical Vehicle

UNCLASSIFIED

TARDEC

FILTER ELEMENT MULTI-PASS TEST REPORT SHEET

ISO/DIS 19438

TEST No. :	MUL00475
TEST DATE :	8/2/12
OPERATOR :	RVL

TEST CONTAMINANT	
TYPE :	A-3
BATCH No. :	5544Q

FILTER AND ELEMENT IDENTIFICATION	
P/N :	23530707
ELEMENT ID :	FL12-1198
HOUSING ID :	
ELEMENT TYPE :	Spin on
MIN. ELEMENT BUBBLE POINT (in. H2O) :	0.00
BUBBLE POINT TO ISO 2942 (in. H2O) :	0.00
WETTING FLUID :	ALCOHOL

TEST SYSTEM	
FLOW RATE (gpm) :	1.50
INITIAL VOLUME (L) :	13.00
FINAL VOLUME (L) :	13.00

UPSTREAM CONCENTRATION (mg/L)			
BASE :	54.78	80% :	36.00

DIFFERENTIAL PRESSURE DATA	
TERMINAL ELEMENT (psid) :	10.00
FILTER HOUSING (psid) :	57.71
CLEAN ASSEMBLY (psid) :	55.92
CLEAN ELEMENT (psid) :	-1.79
NET (psid) :	11.79

TEST FLUID	
TYPE :	Shell
REF :	5606
BATCH No. :	4055728
VISCOSITY (cSt) :	15.00
TEMPERATURE (oF) :	100.00
ANTI-STATIC TYPE ADDED :	Stadis 450
CONDUCTIVITY (pS/m) :	1500.00

INJECTION SYSTEM			
	INITIAL	FINAL	AVERAGE
FLOW (L/min)	0.306	0.291	0.298
CONCEN. (mg/L)	1040.000	1044.000	1042.000

RETENTION CAPACITY (gram)			
TEST DUST			
INJECTED :	32.57	RETAINED :	31.68

COUNTING SYSTEM	COUNTER AND SENSOR REF.	FLOW RATE (ml/min)	DILUTION RATIO
UPSTREAM	Met One	50	4.0:1
DOWNSTREAM	Met One	50	4.9:1

COUNTER CALIBRATION METHOD	COUNTER CALIBRATION DATE
ISO 11171	6/30/12

DIFFERENTIAL PRESSURE VERSUS CONTAMINANT ADDED

% NET PRESSURE	TEST TIME (min)	ELEMENT DP (psid)	INJECTED MASS (gram)
5%	0.13	-1.20	0.04
10%	1.48	-0.61	0.46
15%	4.11	-0.02	1.28
20%	16.45	0.57	5.12
40%	55.66	2.93	17.31
80%	83.35	7.64	25.92
100%	104.70	10.00	32.57

EFFICIENCY DATA

	4.0 um(c)	6.0 um(c)	8.0 um(c)	10.0 um(c)	12.0 um(c)	15.0 um(c)	25.0 um(c)	30.0 um(c)
MAX. EFF. (%)	94.84	98.04	98.94	99.44	99.62	99.78	99.99	100.00
MIN. EFF. (%)	-7.45	58.10	84.43	93.92	97.08	99.17	99.84	99.84
AVG. EFF. (%)	44.43	77.34	91.30	96.65	98.36	99.49	99.94	99.95

EFFICIENCY (%)	50.0	75.0	90.0	95.0	99.0
PARTICLE SIZE um(c)	4.2	5.8	7.7	9.2	13.3

REMARKS

**TARDEC
FILTER ELEMENT MULTI-PASS TEST REPORT SHEET
ISO/DIS 19438**

P/N :	23530707	TEST No. :	MUL00475
ID :	FL12-1198	TEST DATE :	8/2/12

PARTICLE DISTRIBUTION ANALYSIS (PARTICLES/MILLILITER)

Sample Point		4.0 um(c)	6.0 um(c)	8.0 um(c)	10.0 um(c)	12.0 um(c)	15.0 um(c)	25.0 um(c)	30.0 um(c)
Initial		422.19	19.81	9.41	4.60	2.48	1.21	0.22	0.09
9.97 min	UP	84875.15	56014.34	29447.84	16798.86	10334.37	5164.34	727.33	343.41
-0.47 (psid)	DOWN	88097.98	23014.09	4130.11	802.35	221.45	35.76	0.64	0.17
	EFF.(%)	-3.80	58.91	85.97	95.22	97.86	99.31	99.91	99.95
19.95 min	UP	155542.52	83794.01	32136.37	15283.18	8436.78	3960.66	554.35	260.01
-0.10 (psid)	DOWN	167131.97	34369.79	4729.49	788.65	199.52	25.31	0.05	0.00
	EFF.(%)	-7.45	58.98	85.28	94.84	97.64	99.36	99.99	100.00
29.94 min	UP	157553.98	89516.28	35449.50	17040.16	9397.11	4351.69	603.81	284.00
-0.32 (psid)	DOWN	168285.17	37509.33	5520.56	979.96	253.09	31.69	0.04	0.02
	EFF.(%)	-6.81	58.10	84.43	94.25	97.31	99.27	99.99	99.99
39.92 min	UP	155612.70	86841.21	34844.55	16805.00	9270.05	4277.48	590.43	281.65
0.20 (psid)	DOWN	155601.14	33868.61	5371.11	1022.19	270.39	33.52	0.05	0.02
	EFF.(%)	0.01	61.00	84.59	93.92	97.08	99.22	99.99	99.99
49.90 min	UP	150418.95	80121.09	32919.48	16152.03	8976.50	4168.61	577.29	275.54
1.65 (psid)	DOWN	120852.45	24543.26	4334.94	893.67	252.72	34.69	0.09	0.04
	EFF.(%)	19.66	69.37	86.83	94.47	97.18	99.17	99.98	99.99
59.88 min	UP	138602.23	69956.66	30040.37	15172.75	8540.56	4024.95	562.90	269.14
4.11 (psid)	DOWN	53696.07	10779.02	2215.59	503.46	150.25	23.31	0.19	0.06
	EFF.(%)	61.26	84.59	92.62	96.68	98.24	99.42	99.97	99.98
69.87 min	UP	129119.00	64269.31	28388.41	14587.24	8284.03	3944.27	549.67	264.85
5.60 (psid)	DOWN	16529.61	3424.26	773.14	185.75	59.34	11.37	0.41	0.17
	EFF.(%)	87.20	94.67	97.28	98.73	99.28	99.71	99.93	99.94
79.85 min	UP	126700.92	63060.84	28127.07	14541.83	8288.91	3962.61	556.21	263.27
6.67 (psid)	DOWN	9770.84	1938.93	451.05	114.54	38.76	8.91	0.50	0.25
	EFF.(%)	92.29	96.93	98.40	99.21	99.53	99.78	99.91	99.90
89.82 min	UP	125157.73	61326.95	27172.95	13997.75	7960.44	3808.21	533.38	253.21
7.89 (psid)	DOWN	7798.13	1537.61	363.80	94.07	33.23	8.40	0.58	0.25
	EFF.(%)	93.77	97.49	98.66	99.33	99.58	99.78	99.89	99.90

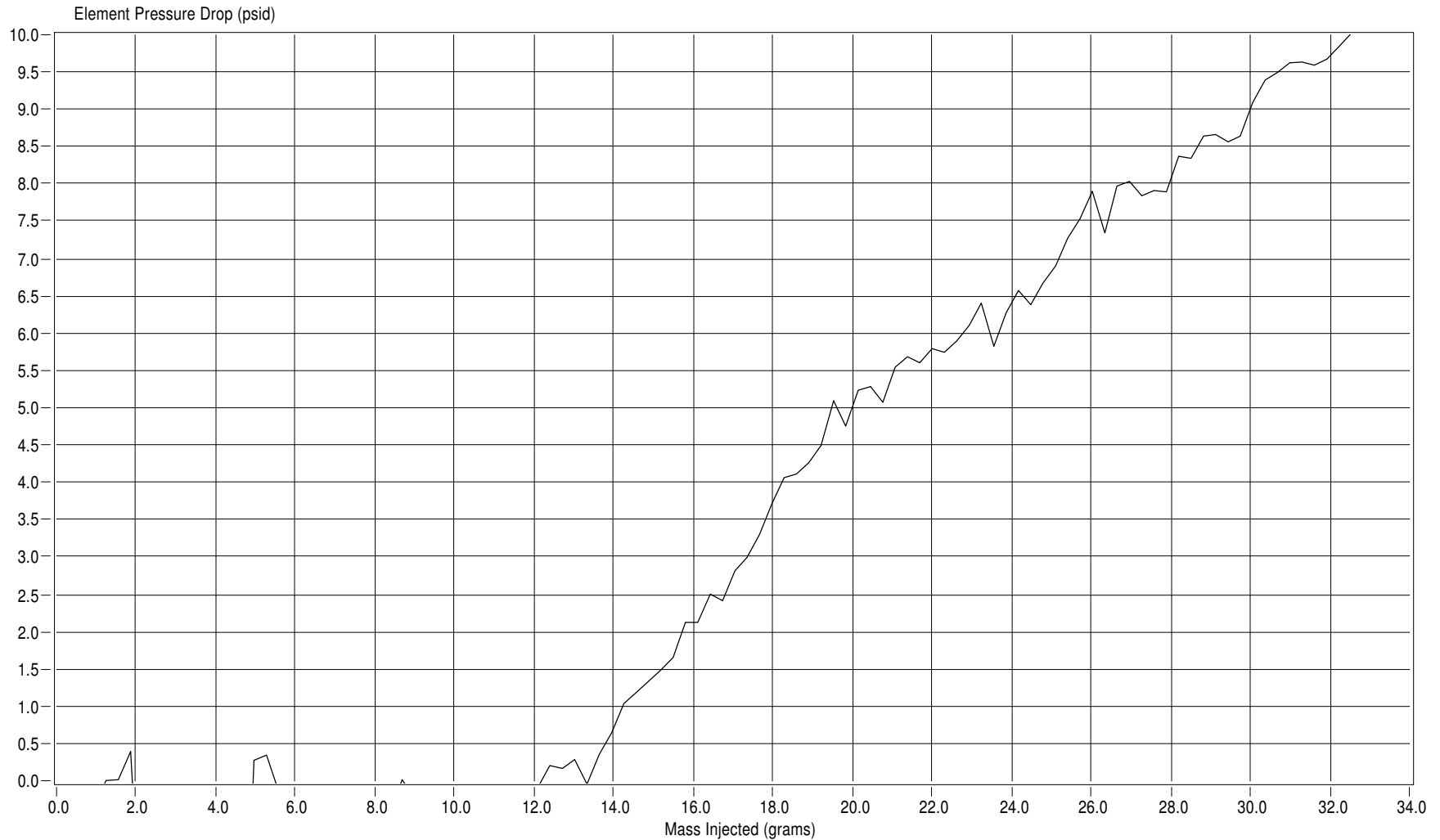
P/N :	23530707	TEST No. :	MUL00475
ID :	FL12-1198	TEST DATE :	8/2/12

[illegible]

Differential Pressure Versus Contaminant Added

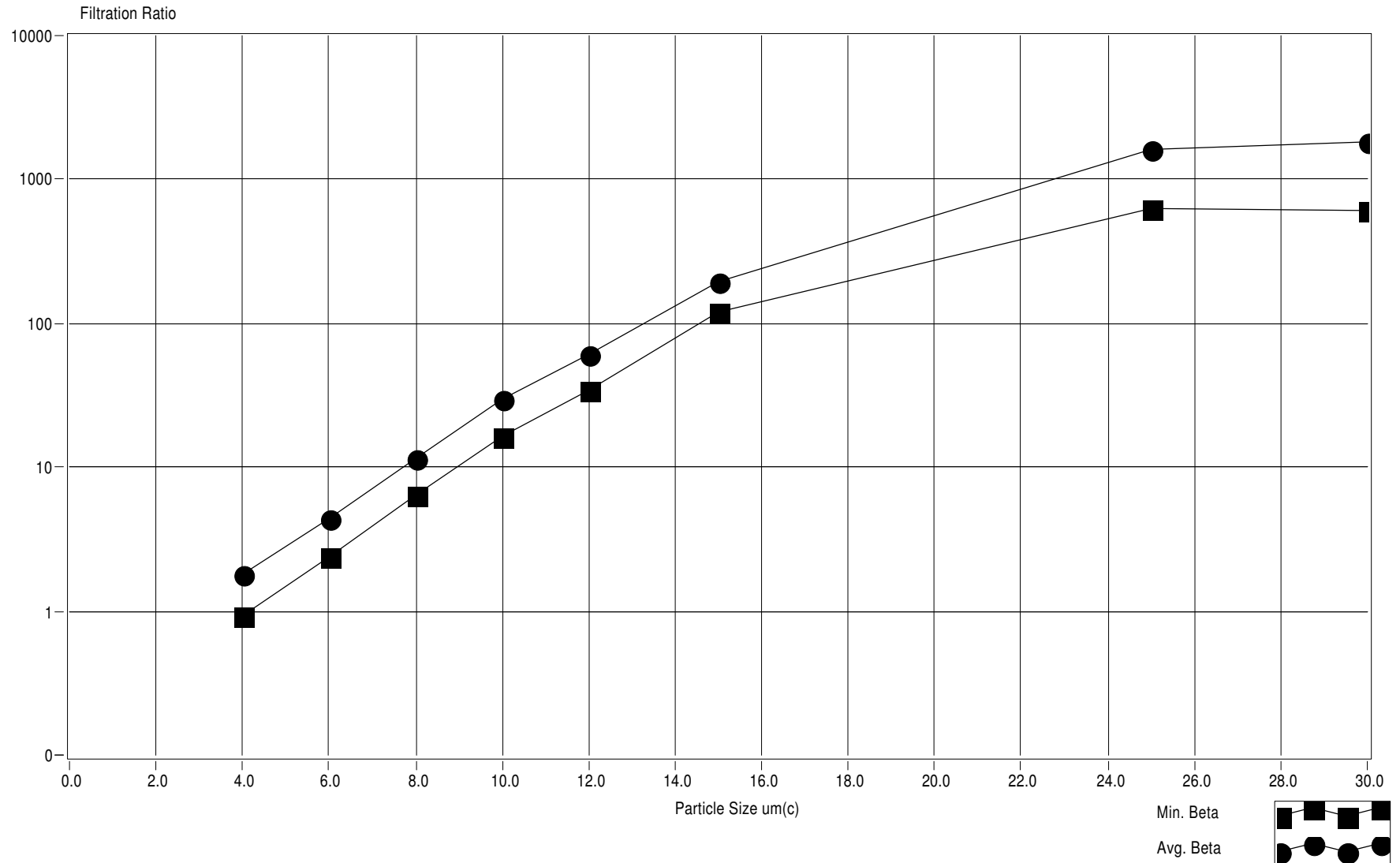
P/N.: 23530707
ID: FL12-1198
TERMINAL (psid): 10.00

TEST No.: MUL00475
TEST DATE: 8/2/12
OPERATOR: RVL



Filtration Ratio Versus Particle Size

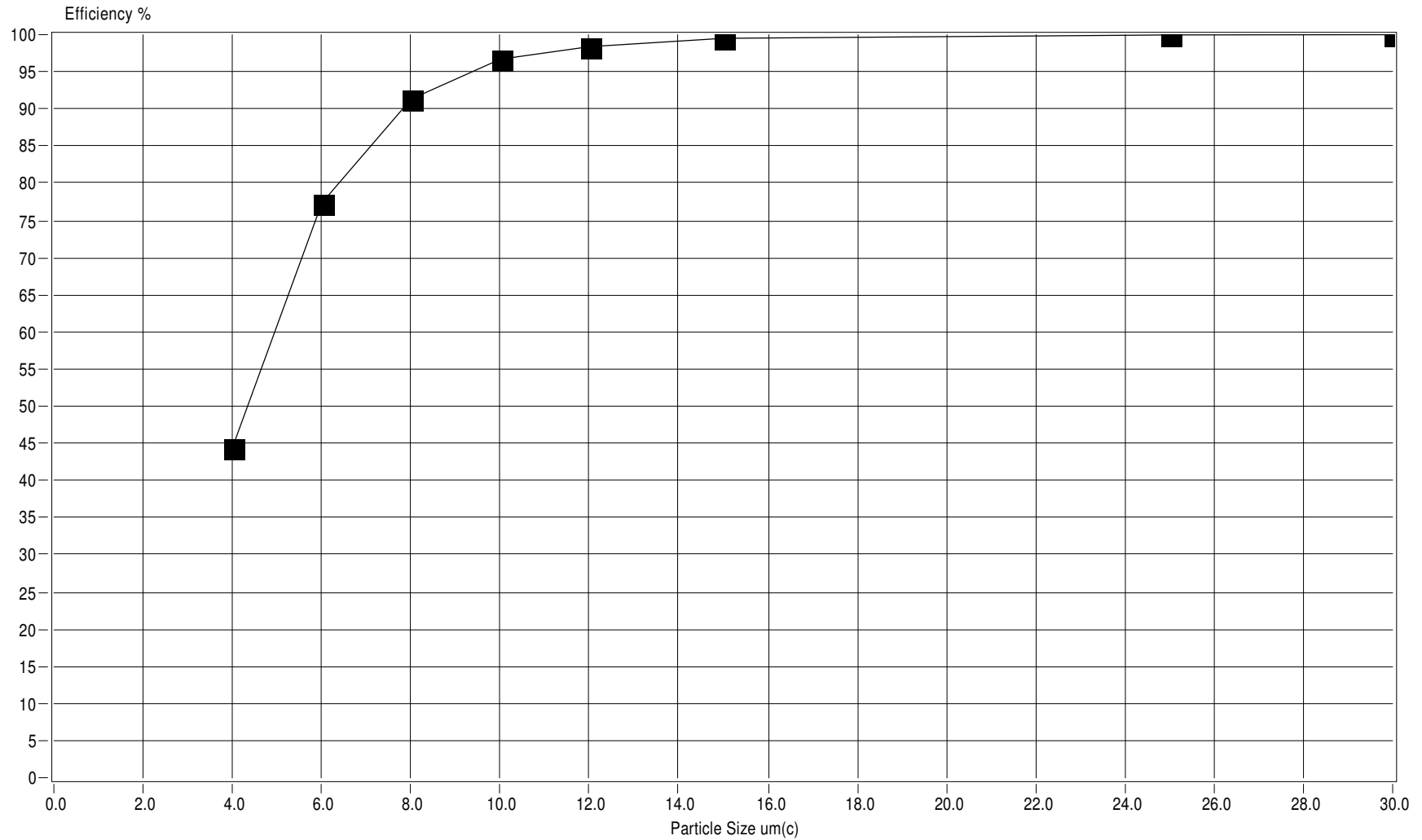
P/N.:	23530707	TEST No.:	MUL00475
ID:	FL12-1198	TEST DATE:	8/2/12
TERMINAL (psid):	10.00	OPERATOR:	RVL



Efficiency Versus Particle Size

P/N.: 23530707
ID: FL12-1198
TERMINAL (psid): 10.00

TEST No.: MUL00475
TEST DATE: 8/2/12
OPERATOR: RVL



TARDEC MULTI-PASS TEST DATA SHEET

P/N:	23530707
ID:	FL12-1198
Test No.:	MUL00475

P/N:	23530707
Element ID:	FL12-1198
Test No.:	MUL00475
Test Date:	8/2/12
Operator:	RVL
Manufacture:	DETROIT DIESEL
Element Type:	Spin on
General Inf.:	DDC SERIES 60
Project No.:	100884
Company:	ARMY-WD 17
Test Housing ID:	

Element Area (Sq.Inch)	1.000E+0
Capacity (g/Sq.Inch)	32.57
Flux (gpm/Sq.Inch)	1.50
No. of Pleats:	0.00
Pleat Height (Inch)	0.00
Pleat Length (Inch)	0.00
Filter O.D. (Inch)	0.00

Initial Injection Volume [l]:	83.00
Final Injection Volume [l]:	51.76
Inj. Temperature [oF]:	100.00

Test Fluid Ref:	5606
Batch No.:	4055728
Test Fluid Type:	Shell
Antistatic Type:	Stadis 450
Bubble Point Fluid:	ALCOHOL

Initial System Volume [l]:	13.00
Final System Volume [l]:	13.00
Anti-Static Added [ppm]:	100.00
Temperature [oF]:	100.00
Conductivity [pS/M]:	1500.00
Viscosity[cSt]:	15.00
RH%:	0.00
Flow Rate [gpm]:	1.50
Bubble Point [in. H2O]:	0.00
MIN. BUBBLE POINT [in. H2O]:	0.00

Dust Type:	A-3
Batch No.:	5544Q

Media:	
Layer 1 :	
Layer 2 :	
Layer 3 :	
Layer 4 :	
Layer 5 :	
Layer 6 :	
Layer 7 :	

Test Sys. Cleanliness [particle/ml]:	422.189
Inj. Sys.Cleanliness [particle/ml]:	0.000
Approximate Element Capacity [g] :	0.000
Required Inj. Grav. Level [mg/l] :	1135.620
Contaminant Required [g] :	94.256
Calculated Test Time[min] :	0.000
Sensor Flow [ml/min] :	50.000

TARDEC MULTI-PASS TEST DATA SHEET

P/N:	23530707
ID:	FL12-1198
Test No.:	MUL00475

Terminal Pressure [psid]:	10.00
Housing Pressure [psid]:	57.71
Clean Assembly [psid]:	55.92
Clean Filter Media [psid]:	-1.79
Net [psid]:	11.79

Dust Injected [g]:	32.57
Dust Retained [g]:	31.68

Base U.G.L [mg/l]:	54.78
Final U.G.L [mg/L]:	36.00

Initial Inj Grav. [mg/l]:	1040.00
Final Inj Grav. [mg/L]:	1044.00

Initial Inj Flow [lpm]:	0.31
Final Inj Flow [lpm]:	0.29

% Assembly	Time at	Time of Count
D.P.	% of Assembly	at % of
	D.P. [min]	Assembly
		D.P. [min]
2.5%	0.06	0.01
5%	0.13	0.01
10%	1.48	1.00
15%	4.11	3.98
20%	16.45	15.96
30%	50.16	49.90
40%	55.66	54.89
80%	83.35	82.84
100%	104.70	103.80

Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
BCK	55.92	1.00	UP	387.19	34.49	17.68	8.90	4.85	2.40	0.44	0.18	50.64	100.25
0		1.00	DOWN	457.19	5.13	1.15	0.30	0.12	0.02	0.00	0.00	50.75	
			BETA	0.85	6.72	15.37	29.67	40.42	120.00	99999.99	99999.99		
0.01	56.69	1.00	UP	10726.79	4105.48	1659.38	810.50	441.00	207.31	30.44	14.22	52.60	99.88
1		1.00	DOWN	3913.33	572.98	95.63	17.03	4.65	0.56	0.02	0.00	50.62	
			BETA	2.74	7.17	17.35	47.59	94.84	370.20	1522.00	99999.99		
1.00	57.16	1.00	UP	28352.52	15954.37	7524.32	3996.00	2311.42	1114.00	155.61	72.61	49.61	99.60
2		1.00	DOWN	21762.70	5578.61	1002.19	183.20	43.98	4.85	0.00	0.00	50.46	
			BETA	1.30	2.86	7.51	21.81	52.56	229.69	99999.99	99999.99		
1.99	57.30	1.00	UP	31734.66	21494.62	11383.45	6397.58	3857.27	1898.83	261.84	121.22	50.67	99.52
3		1.00	DOWN	28647.46	9252.15	1767.33	336.01	81.62	8.55	0.02	0.02	49.98	
			BETA	1.11	2.32	6.44	19.04	47.26	222.09	13092.00	6061.00		
2.99	57.34	1.00	UP	32443.24	24007.06	13626.47	7935.57	4890.31	2449.94	343.66	162.50	49.48	99.45
4		1.00	DOWN	30975.56	11997.67	2468.04	473.68	117.96	12.68	0.02	0.00	49.46	
			BETA	1.05	2.00	5.52	16.75	41.46	193.21	17183.00	99999.99		
3.98	57.71	1.00	UP	33145.22	25643.77	15211.76	9080.21	5703.37	2880.89	402.21	185.69	49.26	99.33
5		1.00	DOWN	31839.48	13881.45	3034.98	604.65	154.57	16.73	0.02	0.00	49.86	
			BETA	1.04	1.85	5.01	15.02	36.90	172.20	20110.50	99999.99		
4.99	57.72	1.00	UP	33568.10	26576.55	16117.21	9769.25	6192.37	3139.94	444.42	209.96	50.26	99.31
6		1.00	DOWN	32379.08	15437.07	3555.85	713.92	181.16	19.26	0.04	0.00	50.16	
			BETA	1.04	1.72	4.53	13.68	34.18	163.03	11110.50	99999.99		
5.98	58.10	2.93	UP	98731.23	78962.14	48136.16	29158.05	18520.75	9380.80	1324.62	627.71	49.39	99.43
7		3.76	DOWN	102132.88	35381.25	7479.53	1677.55	530.13	114.77	2.81	0.68	49.28	
			BETA	0.97	2.23	6.44	17.38	34.94	81.74	471.40	923.10		
6.98	55.17	2.94	UP	98559.57	79238.08	48600.70	29506.39	18728.56	9472.70	1338.41	625.84	54.30	99.68
8		4.23	DOWN	111885.54	28962.04	4613.46	823.66	216.92	31.77	0.34	0.17	49.46	
			BETA	0.88	2.74	10.53	35.82	86.34	298.16	3936.50	3681.41		
7.98	56.79	4.76	UP	143275.31	82226.35	36451.39	18883.32	10959.34	5338.05	745.52	357.71	49.88	99.86
9		9.15	DOWN	149414.50	26612.09	3818.99	684.86	190.97	35.34	0.74	0.19	50.42	
			BETA	0.96	3.09	9.54	27.57	57.39	151.05	1007.46	1882.68		
8.98	56.96	5.17	UP	154403.36	75446.42	27991.16	13259.22	7345.92	3488.08	492.44	234.47	49.77	100.04
10		7.89	DOWN	158058.81	28827.04	3939.94	638.14	158.46	19.77	0.48	0.16	49.97	
			BETA	0.98	2.62	7.10	20.78	46.36	176.43	1025.92	1465.44		
9.97	57.24	5.01	UP	152170.48	76864.20	28841.68	13688.49	7575.58	3599.76	508.95	243.49	50.07	100.18
11		7.32	DOWN	161610.34	31406.34	4321.58	704.65	175.09	22.75	0.00	0.00	50.07	
			BETA	0.94	2.45	6.67	19.43	43.27	158.23	99999.99	99999.99		
10.98	57.31	5.01	UP	153131.89	78568.75	29495.35	13939.47	7613.93	3608.22	511.38	239.99	49.63	100.38
12		7.17	DOWN	164076.47	32768.76	4462.78	730.91	187.36	27.51	0.14	0.00	50.01	
			BETA	0.93	2.40	6.61	19.07	40.64	131.16	3652.71	99999.99		
11.97	57.16	4.99	UP	154040.06	80816.88	30624.44	14505.90	8022.22	3791.25	523.90	236.04	49.76	100.51
13		7.02	DOWN	165709.91	33660.17	4556.99	739.42	182.59	24.67	0.00	0.00	49.95	
			BETA	0.93	2.40	6.72	19.62	43.94	153.68	99999.99	99999.99		
12.97	57.05	4.98	UP	154662.44	82863.98	31788.70	15160.96	8415.12	3963.67	545.63	246.46	50.14	100.66
14		6.87	DOWN	168980.95	33854.57	4614.27	765.04	190.84	22.76	0.14	0.00	50.24	
			BETA	0.92	2.45	6.89	19.82	44.10	174.15	3897.36	99999.99		

P/N: 23530707

Test No.: MUL00475

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ID: FL12-1198

Test Date: 8/2/12

Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
13.96	57.15	5.00	UP	155713.28	84625.74	32573.57	15570.71	8571.68	3994.23	549.64	263.57	49.83	100.65
15		7.13	DOWN	178297.25	35994.86	4915.87	817.77	208.01	22.92	0.14	0.00	49.74	
			BETA	0.87	2.35	6.63	19.04	41.21	174.27	3926.00	99999.99		
14.97	53.75	5.01	UP	156529.83	86195.37	33537.05	16004.86	8832.15	4141.59	582.13	268.47	49.72	100.59
16		7.45	DOWN	175876.23	34422.32	4687.57	768.21	197.94	23.56	0.00	0.00	49.92	
			BETA	0.89	2.50	7.15	20.83	44.62	175.79	99999.99	99999.99		
15.96	57.98	5.00	UP	156553.42	84744.97	32005.97	15068.66	8296.81	3867.03	544.65	255.61	49.83	100.64
17		6.00	DOWN	158854.69	33977.04	4684.76	774.34	194.80	24.26	0.00	0.00	50.00	
			BETA	0.99	2.49	6.83	19.46	42.59	159.40	99999.99	99999.99		
16.97	58.05	5.01	UP	157588.05	85907.11	32597.65	15362.86	8440.22	3954.96	559.89	269.86	50.38	100.70
18		6.03	DOWN	162441.56	35067.89	4818.92	809.99	209.10	25.68	0.00	0.00	50.01	
			BETA	0.97	2.45	6.76	18.97	40.36	154.01	99999.99	99999.99		
17.96	57.57	4.99	UP	156996.91	87779.99	34319.94	16408.83	9087.22	4255.99	594.64	281.33	50.23	100.75
19		6.20	DOWN	168106.22	35887.24	4990.05	857.05	216.89	28.89	0.00	0.00	50.08	
			BETA	0.93	2.45	6.88	19.15	41.90	147.32	99999.99	99999.99		
18.96	57.39	5.00	UP	158038.77	89573.08	35579.39	17121.07	9512.83	4429.85	622.69	295.31	50.27	100.69
20		6.12	DOWN	167365.97	36658.65	5242.10	919.14	232.60	30.14	0.12	0.00	49.96	
			BETA	0.94	2.44	6.79	18.63	40.90	146.98	5189.08	99999.99		
19.95	57.61	4.98	UP	157252.84	89423.62	35511.17	17126.96	9438.17	4333.81	597.03	277.61	50.22	100.65
21		6.12	DOWN	167851.05	37327.84	5388.27	931.21	253.51	31.52	0.00	0.00	49.97	
			BETA	0.94	2.40	6.59	18.39	37.23	137.49	99999.99	99999.99		
20.96	57.48	4.99	UP	157848.34	89850.57	35699.59	17223.59	9548.26	4428.41	604.77	285.94	50.06	100.66
22		6.14	DOWN	168887.52	37733.95	5471.81	949.94	237.86	26.54	0.00	0.00	50.08	
			BETA	0.93	2.38	6.52	18.13	40.14	166.86	99999.99	99999.99		
21.96	57.23	4.99	UP	157259.50	90128.96	35940.21	17371.62	9607.85	4486.70	621.99	301.55	50.06	100.62
23		6.18	DOWN	170215.41	38293.71	5600.30	999.55	268.57	38.49	0.00	0.00	50.37	
			BETA	0.92	2.35	6.42	17.38	35.77	116.57	99999.99	99999.99		
22.95	57.41	5.02	UP	158246.92	89881.05	35443.60	16966.63	9302.12	4301.42	611.23	284.44	49.67	100.60
24		6.15	DOWN	169970.98	38012.40	5555.84	982.15	246.44	31.49	0.00	0.00	49.46	
			BETA	0.93	2.36	6.38	17.27	37.75	136.60	99999.99	99999.99		
23.95	57.34	5.01	UP	158144.33	89732.27	35365.75	16942.77	9332.49	4313.74	608.28	284.74	50.21	100.62
25		6.10	DOWN	169236.02	37780.86	5494.27	972.03	245.04	31.12	0.25	0.12	49.98	
			BETA	0.93	2.38	6.44	17.43	38.09	138.62	2433.12	2372.83		
24.95	57.38	4.98	UP	156694.91	88633.78	34876.06	16692.17	9188.62	4280.74	596.41	285.65	50.01	100.63
26		6.03	DOWN	167434.55	37311.10	5466.08	957.43	242.83	26.90	0.00	0.00	50.00	
			BETA	0.94	2.38	6.38	17.43	37.84	159.14	99999.99	99999.99		
25.94	57.42	5.03	UP	158091.19	89639.84	35348.54	16925.45	9304.65	4291.06	603.80	285.06	50.08	100.63
27		6.15	DOWN	170164.81	37718.56	5597.15	1002.53	257.02	32.50	0.00	0.00	50.07	
			BETA	0.93	2.38	6.32	16.88	36.20	132.03	99999.99	99999.99		
26.95	57.28	4.98	UP	156841.17	89103.05	35311.93	16977.14	9393.67	4330.51	592.44	277.68	49.71	100.62
28		6.08	DOWN	167860.31	37236.34	5529.87	992.54	256.72	28.95	0.00	0.00	49.99	
			BETA	0.93	2.39	6.39	17.10	36.59	149.59	99999.99	99999.99		
27.95	57.72	5.02	UP	157607.73	89456.49	35528.00	17078.48	9422.56	4378.41	596.09	273.28	49.98	100.66
29		6.00	DOWN	165664.87	36940.70	5530.58	994.94	260.08	33.64	0.00	0.00	50.14	
			BETA	0.95	2.42	6.42	17.17	36.23	130.15	99999.99	99999.99		

P/N: 23530707

Test No.: MUL00475

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ID: FL12-1198

Test Date: 8/2/12

Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
28.94	57.48	5.01	UP	157552.84	89313.20	35470.14	17096.82	9432.67	4372.08	606.09	284.08	49.89	100.70
30		6.02	DOWN	165566.16	36737.83	5571.48	1017.23	262.85	35.76	0.12	0.12	50.03	
			BETA	0.95	2.43	6.37	16.81	35.89	122.26	5050.75	2367.33		
29.94	57.39	4.98	UP	156438.17	88637.02	35332.62	16993.56	9355.78	4322.70	589.16	280.78	50.55	100.76
31		6.07	DOWN	165752.89	36601.41	5572.06	1030.05	273.41	33.33	0.00	0.00	49.98	
			BETA	0.94	2.42	6.34	16.50	34.22	129.69	99999.99	99999.99		
30.93	57.35	5.00	UP	157274.20	88787.87	35364.89	17018.30	9396.35	4343.67	589.54	289.21	50.11	100.82
32		6.06	DOWN	164235.86	36257.31	5518.62	1023.86	261.35	29.47	0.12	0.00	49.95	
			BETA	0.96	2.45	6.41	16.62	35.95	147.39	4912.83	99999.99		
31.94	57.42	5.02	UP	156987.83	88049.96	34942.63	16729.76	9217.95	4247.56	590.68	273.02	49.64	100.89
33		5.96	DOWN	160976.66	35477.19	5474.03	1010.55	257.64	33.74	0.00	0.00	49.97	
			BETA	0.98	2.48	6.38	16.56	35.78	125.89	99999.99	99999.99		
32.93	57.24	4.99	UP	156223.87	87908.95	35296.30	16973.46	9361.31	4336.76	586.52	276.21	50.22	101.00
34		6.04	DOWN	161156.19	35294.77	5508.18	1036.77	270.75	35.99	0.00	0.00	50.19	
			BETA	0.97	2.49	6.41	16.37	34.58	120.50	99999.99	99999.99		
33.93	57.48	4.98	UP	155493.09	86737.68	34576.34	16640.76	9155.80	4224.26	597.00	294.62	49.88	101.07
35		5.86	DOWN	155479.31	33906.17	5354.14	1013.55	267.09	33.62	0.12	0.12	49.98	
			BETA	1.00	2.56	6.46	16.42	34.28	125.65	4975.00	2455.17		
34.92	57.53	5.02	UP	156310.55	87238.77	35046.36	16929.64	9337.70	4284.71	572.25	272.85	49.79	101.14
36		5.96	DOWN	155912.00	33846.46	5374.20	1027.02	265.77	32.94	0.00	0.00	50.06	
			BETA	1.00	2.58	6.52	16.48	35.13	130.08	99999.99	99999.99		
35.93	57.61	5.01	UP	155176.31	86164.56	34616.22	16716.80	9210.97	4269.37	598.53	285.49	49.92	101.43
37		5.87	DOWN	152089.22	33055.51	5344.60	1007.44	272.81	31.64	0.00	0.00	50.00	
			BETA	1.02	2.61	6.48	16.59	33.76	134.94	99999.99	99999.99		
36.92	57.50	4.98	UP	154091.39	84940.81	34060.91	16428.34	9091.70	4197.99	589.54	279.24	50.05	101.39
38		5.86	DOWN	149739.66	32111.69	5197.82	1018.10	271.82	33.99	0.00	0.00	50.08	
			BETA	1.03	2.65	6.55	16.14	33.45	123.51	99999.99	99999.99		
37.93	57.60	5.01	UP	154715.41	85111.68	34466.85	16690.11	9207.94	4227.53	594.77	285.43	49.84	100.99
39		5.86	DOWN	147124.16	31280.50	5149.49	1001.95	270.93	33.13	0.24	0.12	50.05	
			BETA	1.05	2.72	6.69	16.66	33.99	127.60	2478.21	2378.58		
38.92	57.61	4.98	UP	153416.27	84834.82	34742.43	16929.27	9365.03	4320.22	596.34	279.61	50.13	100.77
40		5.78	DOWN	143545.44	30855.13	5217.94	1052.59	292.34	37.33	0.00	0.00	49.89	
			BETA	1.07	2.75	6.66	16.08	32.03	115.73	99999.99	99999.99		
39.92	57.91	4.99	UP	153281.17	83657.12	33965.58	16560.12	9173.83	4269.74	591.11	278.22	50.03	100.65
41		5.74	DOWN	140175.45	29785.16	5032.70	1009.51	286.66	40.57	0.23	0.00	50.20	
			BETA	1.09	2.81	6.75	16.40	32.00	105.24	2570.04	99999.99		
40.92	57.87	5.02	UP	153685.12	84115.86	34431.19	16846.24	9325.22	4306.79	583.33	280.06	49.93	100.55
42		5.80	DOWN	138217.50	29202.77	4973.32	1003.65	283.77	36.39	0.00	0.00	49.84	
			BETA	1.11	2.88	6.92	16.78	32.86	118.35	99999.99	99999.99		
41.92	57.99	5.00	UP	152486.12	82730.97	33816.74	16498.28	9160.63	4258.47	580.62	277.29	50.36	100.39
43		5.77	DOWN	134113.67	27994.02	4836.97	982.18	271.28	36.33	0.00	0.00	49.87	
			BETA	1.14	2.96	6.99	16.80	33.77	117.22	99999.99	99999.99		
42.92	57.66	5.02	UP	152051.23	81377.22	32953.86	16029.49	8875.07	4099.25	583.78	274.01	49.91	100.21
44		5.87	DOWN	131129.12	26709.16	4588.25	932.81	262.63	33.51	0.00	0.00	50.08	
			BETA	1.16	3.05	7.18	17.18	33.79	122.33	99999.99	99999.99		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
43.91	58.06	4.97	UP	150116.06	80013.66	32669.19	15978.71	8838.39	4079.28	579.31	274.44	49.85	100.00
45		5.80	DOWN	125762.67	25336.69	4426.11	893.92	253.92	36.47	0.12	0.00	49.87	
			BETA	1.19	3.16	7.38	17.87	34.81	111.85	4827.58	99999.99		
44.91	58.35	5.02	UP	150727.12	80072.70	32895.75	16127.98	8962.00	4144.24	581.25	277.61	50.06	99.81
46		5.80	DOWN	120472.09	24194.59	4261.03	885.71	246.93	34.62	0.12	0.12	49.97	
			BETA	1.25	3.31	7.72	18.21	36.29	119.71	4843.75	2313.42		
45.90	58.74	4.99	UP	149225.69	79281.11	32868.19	16231.92	9093.43	4238.40	590.55	286.92	49.85	99.70
47		5.80	DOWN	115361.16	22925.35	4180.71	888.75	253.21	34.25	0.12	0.00	49.95	
			BETA	1.29	3.46	7.86	18.26	35.91	123.75	4921.25	99999.99		
46.91	58.89	5.03	UP	148796.19	77700.65	32105.82	15821.07	8802.39	4085.74	553.02	259.42	49.90	99.53
48		5.81	DOWN	107990.39	21161.29	3871.95	817.26	230.26	33.50	0.00	0.00	49.67	
			BETA	1.38	3.67	8.29	19.36	38.23	121.96	99999.99	99999.99		
47.90	59.04	4.98	UP	146949.03	76338.13	31655.68	15623.27	8687.03	4044.41	552.78	266.22	50.34	99.41
49		5.85	DOWN	101418.60	19793.96	3689.35	776.23	218.83	29.73	0.24	0.12	49.98	
			BETA	1.45	3.86	8.58	20.13	39.70	136.04	2303.25	2218.50		
48.90	59.19	5.02	UP	146871.84	75923.53	31832.82	15803.24	8847.05	4159.79	577.14	281.17	49.37	99.32
50		5.88	DOWN	93883.80	18329.63	3489.03	746.73	219.70	31.54	0.12	0.12	49.97	
			BETA	1.56	4.14	9.12	21.16	40.27	131.89	4809.50	2343.08		
49.90	59.36	4.97	UP	144435.30	74297.72	31289.85	15552.28	8651.13	4033.82	556.51	266.77	49.97	99.27
51		5.84	DOWN	85881.92	16854.56	3285.13	714.56	205.32	28.86	0.12	0.00	49.99	
			BETA	1.68	4.41	9.52	21.76	42.13	139.77	4637.58	99999.99		
50.90	59.83	4.99	UP	143603.00	73732.04	31283.92	15667.93	8749.56	4120.60	574.19	272.10	50.20	99.19
52		5.84	DOWN	78421.47	15435.57	3033.22	669.85	189.77	26.05	0.24	0.00	49.97	
			BETA	1.83	4.78	10.31	23.39	46.11	158.18	2392.46	99999.99		
51.89	59.83	5.04	UP	143304.55	73073.58	31184.77	15690.99	8805.02	4112.50	570.36	277.96	49.85	99.16
53		5.89	DOWN	70165.09	13911.02	2783.61	629.59	185.79	26.25	0.00	0.00	49.88	
			BETA	2.04	5.25	11.20	24.92	47.39	156.67	99999.99	99999.99		
52.90	60.21	5.02	UP	141800.22	72414.64	31103.22	15734.63	8845.67	4181.11	588.09	281.98	49.70	99.10
54		5.91	DOWN	62589.58	12558.78	2591.67	602.24	178.07	29.36	0.12	0.00	49.90	
			BETA	2.27	5.77	12.00	26.13	49.68	142.41	4900.75	99999.99		
53.89	60.12	5.00	UP	139601.23	70582.69	30316.56	15292.38	8619.97	4057.39	581.88	273.86	49.64	99.08
55		6.01	DOWN	55358.63	11131.38	2320.46	524.30	161.74	24.51	0.00	0.00	50.04	
			BETA	2.52	6.34	13.06	29.17	53.30	165.54	99999.99	99999.99		
54.89	60.52	5.03	UP	138539.91	69715.67	30025.25	15189.66	8573.49	4036.70	568.43	271.83	50.55	99.08
56		5.92	DOWN	47955.33	9738.99	2052.52	467.77	143.76	23.20	0.12	0.12	49.86	
			BETA	2.89	7.16	14.63	32.47	59.64	174.00	4736.92	2265.25		
55.88	60.70	5.00	UP	136269.87	68159.20	29530.05	14979.31	8467.92	3996.92	557.52	266.91	49.90	99.07
57		5.87	DOWN	41654.92	8532.72	1815.60	416.44	130.17	21.91	0.71	0.24	49.94	
			BETA	3.27	7.99	16.26	35.97	65.05	182.42	785.24	1112.13		
56.89	61.01	4.99	UP	134197.70	66564.93	28752.95	14639.61	8282.51	3916.69	545.60	262.23	50.03	99.11
58		5.87	DOWN	36039.89	7458.82	1607.86	379.93	114.18	18.10	0.24	0.12	50.01	
			BETA	3.72	8.92	17.88	38.53	72.54	216.39	2273.33	2185.25		
57.88	61.42	4.99	UP	132839.16	65748.12	28486.11	14515.03	8220.36	3881.32	549.89	262.79	49.63	99.14
59		5.91	DOWN	31456.04	6487.85	1418.30	341.62	103.01	18.38	0.12	0.12	49.97	
			BETA	4.22	10.13	20.08	42.49	79.80	211.17	4582.42	2189.92		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
58.89	61.77	4.96	UP	131431.41	65278.01	28431.06	14465.68	8189.94	3912.48	536.49	255.01	49.84	99.19
60		5.91	DOWN	27437.81	5680.50	1247.54	288.32	90.70	16.47	0.24	0.00	50.17	
			BETA	4.79	11.49	22.79	50.17	90.30	237.55	2235.37	99999.99		
59.88	61.82	4.99	UP	131559.27	65741.54	28911.73	14770.91	8342.76	3974.74	540.82	258.03	50.07	99.23
61		5.90	DOWN	24490.31	5097.08	1109.97	266.70	84.30	14.03	0.48	0.12	49.93	
			BETA	5.37	12.90	26.05	55.38	98.97	283.30	1126.71	2150.25		
60.88	61.97	5.02	UP	131622.73	65906.97	29074.44	14882.04	8431.05	4019.18	553.05	266.92	49.86	99.31
62		5.89	DOWN	21879.83	4550.94	1032.84	239.95	75.54	11.54	0.36	0.12	50.08	
			BETA	6.02	14.48	28.15	62.02	111.61	348.28	1536.25	2224.33		
61.87	62.20	5.00	UP	129724.41	64338.83	28250.53	14511.17	8257.76	3930.03	554.75	264.97	49.96	99.35
63		5.85	DOWN	19496.72	4030.51	902.69	218.85	68.82	13.93	0.24	0.12	50.08	
			BETA	6.65	15.96	31.30	66.31	119.99	282.13	2311.46	2208.08		
62.88	62.80	5.00	UP	129916.53	64829.56	28630.57	14725.24	8367.33	3965.03	540.58	262.06	49.73	99.48
64		5.90	DOWN	18012.80	3737.39	844.44	201.37	64.54	11.43	0.00	0.00	49.99	
			BETA	7.21	17.35	33.90	73.13	129.65	346.90	99999.99	99999.99		
63.87	62.46	5.01	UP	129183.71	64159.36	28308.87	14486.53	8230.40	3943.49	561.42	280.10	50.16	99.53
65		5.90	DOWN	15912.92	3281.50	747.91	179.72	60.78	13.92	0.24	0.12	50.20	
			BETA	8.12	19.55	37.85	80.61	135.41	283.30	2339.25	2334.17		
64.88	62.94	5.00	UP	128626.52	63913.91	28230.08	14498.86	8237.52	3917.87	548.28	263.14	49.67	99.65
66		5.88	DOWN	14802.37	3106.21	713.60	171.51	52.38	9.74	0.83	0.36	50.14	
			BETA	8.69	20.58	39.56	84.54	157.26	402.25	660.58	730.94		
65.87	62.99	4.97	UP	127670.35	63468.19	28072.66	14455.96	8199.67	3914.86	545.29	260.95	50.15	99.75
67		5.96	DOWN	13816.24	2839.02	652.00	154.37	48.61	10.95	0.72	0.48	50.02	
			BETA	9.24	22.36	43.06	93.64	168.68	357.52	757.35	543.65		
66.87	62.78	5.00	UP	128216.26	63819.59	28262.08	14621.97	8315.86	3947.61	547.08	262.18	49.90	99.84
68		5.95	DOWN	12807.82	2638.10	609.29	149.80	48.49	8.76	0.24	0.12	49.95	
			BETA	10.01	24.19	46.39	97.61	171.50	450.64	2279.50	2184.83		
67.86	63.25	5.01	UP	127715.39	63504.62	28081.37	14438.85	8205.18	3912.92	547.59	265.51	49.85	99.95
69		5.85	DOWN	12338.38	2543.78	571.53	142.23	46.54	8.86	0.35	0.12	49.98	
			BETA	10.35	24.96	49.13	101.52	176.30	441.64	1564.54	2212.58		
68.87	63.39	4.99	UP	126954.80	63010.56	28061.82	14480.83	8252.75	3917.00	557.83	264.66	49.91	100.02
70		5.86	DOWN	11738.71	2418.07	547.13	132.97	43.38	10.52	0.59	0.12	49.97	
			BETA	10.82	26.06	51.29	108.90	190.24	372.34	945.47	2205.50		
69.87	63.31	5.00	UP	126467.81	62741.03	27879.80	14372.92	8208.62	3935.73	560.14	265.85	49.91	100.02
71		5.84	DOWN	11170.20	2261.73	520.48	134.69	49.14	10.72	1.18	0.82	49.95	
			BETA	11.32	27.74	53.57	106.71	167.05	367.14	474.69	324.21		
70.86	63.50	5.03	UP	127496.38	63551.39	28459.34	14751.64	8415.55	4002.71	559.76	261.42	49.74	100.21
72		5.82	DOWN	10639.76	2169.49	495.03	128.87	41.59	9.16	0.59	0.23	50.29	
			BETA	11.98	29.29	57.49	114.47	202.35	436.98	948.75	1136.61		
71.86	63.45	4.97	UP	126448.64	63248.34	28346.30	14668.34	8376.59	3988.41	556.03	266.61	49.87	100.38
73		5.77	DOWN	10135.58	2031.71	475.76	120.49	39.66	8.05	0.00	0.00	49.92	
			BETA	12.48	31.13	59.58	121.74	211.21	495.45	99999.99	99999.99		
72.85	63.60	4.99	UP	126039.51	62461.42	27769.08	14335.12	8161.68	3911.80	545.46	254.37	49.82	100.41
74		5.81	DOWN	9952.27	1998.25	466.66	115.55	39.45	9.95	0.70	0.23	49.86	
			BETA	12.66	31.26	59.51	124.06	206.89	393.15	779.23	1105.96		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor										Sensor Flow (ml/min)	Sys. Temp (oF)
				4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)		
73.86	63.81	5.01	UP	127166.42	63385.71	28260.63	14571.81	8312.61	3955.53	561.83	266.32	50.04	100.47
75		5.70	DOWN	9821.62	1949.72	440.08	114.11	36.50	8.52	0.12	0.00	49.97	
			BETA	12.95	32.51	64.22	127.70	227.74	464.26	4681.92	99999.99		
74.85	64.11	5.04	UP	128216.63	64028.14	28563.04	14790.47	8430.65	4019.49	555.38	265.32	49.69	100.49
76		5.80	DOWN	9765.31	1922.04	442.09	107.15	39.16	7.50	0.47	0.47	49.96	
			BETA	13.13	33.31	64.61	138.04	215.29	535.93	1181.66	564.51		
75.86	63.53	4.93	UP	125291.80	62552.76	27888.99	14417.19	8207.99	3935.82	558.03	263.55	50.02	100.60
77		5.89	DOWN	9132.41	1793.51	422.05	105.45	37.13	9.64	0.71	0.12	49.97	
			BETA	13.72	34.88	66.08	136.72	221.06	408.28	785.96	2196.25		
76.85	63.98	5.04	UP	127156.13	63168.62	28129.26	14535.21	8284.20	3975.50	549.21	260.83	49.92	100.66
78		5.78	DOWN	9161.70	1772.32	413.41	104.90	33.26	8.52	0.58	0.23	49.92	
			BETA	13.88	35.64	68.04	138.56	249.07	466.61	946.91	1134.04		
77.85	64.28	5.06	UP	127982.23	63563.14	28347.99	14687.16	8351.72	3983.49	563.20	263.92	49.80	100.75
79		5.66	DOWN	9186.66	1803.52	438.96	112.88	35.68	8.92	0.46	0.34	49.42	
			BETA	13.93	35.24	64.58	130.11	234.07	446.58	1224.35	776.24		
78.84	64.09	4.94	UP	124743.68	61907.82	27626.26	14288.40	8139.47	3917.59	553.06	264.48	49.64	100.83
80		5.70	DOWN	8742.91	1687.03	395.99	101.35	36.08	8.16	0.23	0.11	49.88	
			BETA	14.27	36.70	69.77	140.98	225.60	480.10	2404.61	2404.36		
79.85	64.38	5.03	UP	126845.62	62782.76	27878.03	14427.74	8228.89	3930.83	544.61	268.49	50.40	100.74
81		5.60	DOWN	8743.57	1685.74	406.96	107.56	37.78	9.61	0.45	0.34	49.86	
			BETA	14.51	37.24	68.50	134.14	217.81	409.04	1210.24	789.68		
80.85	64.61	5.00	UP	125070.68	61869.70	27658.67	14313.99	8146.86	3901.31	542.75	252.93	49.83	100.63
82		5.57	DOWN	8589.42	1699.61	398.24	102.60	37.24	8.89	0.34	0.11	50.00	
			BETA	14.56	36.40	69.45	139.51	218.77	438.84	1596.32	2299.36		
81.84	64.98	5.00	UP	126398.31	63075.91	28315.44	14697.93	8407.55	4033.65	570.25	264.49	49.89	100.51
83		5.59	DOWN	8238.21	1650.64	386.02	98.45	33.31	7.68	0.34	0.11	50.20	
			BETA	15.34	38.21	73.35	149.29	252.40	525.21	1677.21	2404.45		
82.84	65.24	5.02	UP	126827.52	63175.87	28342.51	14681.00	8394.48	4015.63	557.51	264.46	50.29	100.58
84		5.66	DOWN	8646.99	1767.30	422.34	110.88	38.68	9.50	0.92	0.46	49.64	
			BETA	14.67	35.75	67.11	132.40	217.02	422.70	605.99	574.91		
83.83	65.61	5.06	UP	125104.67	60815.15	26849.37	13747.00	7823.72	3751.77	517.77	248.12	49.91	100.41
85		5.62	DOWN	8122.80	1614.02	380.33	96.44	34.00	7.71	0.57	0.23	50.01	
			BETA	15.40	37.68	70.59	142.54	230.11	486.61	908.37	1078.78		
84.84	65.05	5.23	UP	127436.03	61105.15	26792.97	13743.01	7826.46	3731.24	513.59	242.30	50.37	100.43
86		5.61	DOWN	7412.24	1462.51	353.25	92.87	32.73	8.61	0.79	0.11	50.09	
			BETA	17.19	41.78	75.85	147.98	239.12	433.36	650.11	2202.73		
85.83	65.68	4.96	UP	120792.02	57808.65	25189.68	12855.21	7257.09	3475.40	492.74	230.62	49.66	100.46
87		5.56	DOWN	7349.44	1428.86	333.67	85.19	29.85	8.08	0.56	0.45	50.09	
			BETA	16.44	40.46	75.49	150.90	243.12	430.12	879.89	512.49		
86.84	65.74	5.02	UP	123823.22	60187.88	26492.37	13606.35	7678.32	3657.10	526.09	241.70	50.04	100.53
88		5.62	DOWN	7117.02	1388.38	331.58	85.57	31.93	8.86	0.45	0.11	49.96	
			BETA	17.40	43.35	79.90	159.01	240.47	412.77	1169.09	2197.27		
87.83	65.55	4.99	UP	124031.19	60735.65	26884.52	13835.38	7869.38	3781.81	527.78	257.05	50.44	100.58
89		5.73	DOWN	6911.36	1340.60	314.61	79.52	27.32	6.48	0.58	0.35	49.97	
			BETA	17.95	45.30	85.45	173.99	288.04	583.61	909.97	734.43		

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Particle Counts

Time (min) /Count#	D.P. (psid)	Dil. Factor		4.0um(c)	6.0um(c)	8.0um(c)	10.0um(c)	12.0um(c)	15.0um(c)	25.0um(c)	30.0um(c)	Sensor Flow (ml/min)	Sys. Temp (oF)
88.83	65.62	5.01	UP	125248.11	61712.77	27325.97	14069.90	7971.67	3803.40	540.70	261.92	49.62	100.58
90		5.81	DOWN	6850.30	1338.42	311.03	81.63	29.44	8.56	0.82	0.23	50.32	
			BETA	18.28	46.11	87.86	172.36	270.78	444.32	659.39	1138.78		
89.82	65.60	4.98	UP	125010.46	61616.24	27348.33	14100.90	8050.99	3836.19	538.14	259.92	49.69	100.45
91		5.64	DOWN	6987.74	1387.48	331.87	88.69	34.84	8.31	0.57	0.11	49.95	
			BETA	17.89	44.41	82.41	158.99	231.08	461.64	944.11	2362.91		
90.83	66.08	5.03	UP	127935.97	64197.77	28757.16	14833.84	8469.63	4061.31	556.83	270.61	49.54	100.58
92		5.61	DOWN	7168.63	1433.86	346.05	89.96	29.53	8.71	0.68	0.11	50.09	
			BETA	17.85	44.77	83.10	164.89	286.81	466.28	818.87	2460.09		
91.82	66.05	5.01	UP	127984.69	64354.69	28903.71	14983.87	8547.12	4103.53	554.51	259.36	50.23	100.64
93		5.55	DOWN	6862.30	1360.39	333.03	88.25	34.65	10.99	0.56	0.34	49.99	
			BETA	18.65	47.31	86.79	169.79	246.67	373.39	990.20	762.82		
92.83	66.35	4.99	UP	126918.58	63316.86	28305.10	14677.17	8345.36	3989.19	558.22	268.83	49.85	100.51
94		5.59	DOWN	6953.59	1372.83	326.83	86.39	28.65	6.77	0.56	0.23	49.98	
			BETA	18.25	46.12	86.60	169.89	291.29	589.25	996.82	1168.83		
93.82	66.37	5.03	UP	128637.04	64678.88	29056.35	15060.60	8629.60	4123.71	579.77	279.38	49.84	100.58
95		5.63	DOWN	6912.04	1360.59	330.85	87.26	32.65	8.08	0.68	0.34	49.88	
			BETA	18.61	47.54	87.82	172.59	264.31	510.36	852.60	821.71		
94.82	66.27	4.99	UP	126967.95	63410.90	28286.08	14595.52	8329.81	3987.50	553.98	263.58	49.89	100.61
96		5.65	DOWN	6804.38	1316.73	328.38	84.46	31.50	8.10	1.03	0.57	49.94	
			BETA	18.66	48.16	86.14	172.81	264.44	492.28	537.84	462.42		
95.81	66.35	4.98	UP	126211.71	62791.35	28028.13	14491.34	8291.97	3983.37	560.27	272.79	49.84	100.39
97		5.67	DOWN	6626.07	1272.76	302.52	84.22	33.46	8.48	1.15	0.57	49.87	
			BETA	19.05	49.33	92.65	172.07	247.82	469.74	487.19	478.58		
96.82	66.80	5.00	UP	126026.47	62171.57	27611.35	14258.46	8066.45	3857.41	530.22	259.25	49.78	100.41
98		5.58	DOWN	6991.92	1369.17	331.84	85.89	31.00	11.38	1.47	0.68	50.08	
			BETA	18.02	45.41	83.21	166.01	260.21	338.96	360.69	381.25		
97.81	67.10	5.01	UP	127317.48	63289.95	28224.20	14624.03	8328.54	3975.75	564.28	269.49	50.29	100.59
99		5.56	DOWN	6746.00	1318.39	326.28	91.35	35.28	11.57	1.35	0.45	49.98	
			BETA	18.87	48.01	86.50	160.09	236.07	343.63	417.99	598.87		
98.81	67.20	4.99	UP	126626.70	62862.67	28015.02	14493.26	8265.24	3951.99	547.87	261.39	49.36	100.39
100		5.52	DOWN	6622.04	1291.09	313.78	89.19	33.40	8.35	0.78	0.33	49.89	
			BETA	19.12	48.69	89.28	162.50	247.46	473.29	702.40	792.09		
99.81	67.33	5.00	UP	125473.33	61846.12	27486.32	14177.51	8057.73	3902.68	538.58	253.19	50.44	100.15
101		5.55	DOWN	7000.46	1341.49	322.39	88.28	32.87	9.20	0.67	0.56	50.31	
			BETA	17.92	46.10	85.26	160.60	245.14	424.20	803.85	452.12		
100.81	67.34	5.01	UP	126887.38	63021.59	28066.44	14534.38	8310.52	3975.65	556.47	268.83	49.64	100.35
102		5.63	DOWN	6686.24	1268.20	296.36	85.15	31.38	9.44	0.68	0.34	49.97	
			BETA	18.98	49.69	94.70	170.69	264.83	421.15	818.34	790.68		
101.80	67.30	5.00	UP	126853.26	63259.24	28176.96	14544.76	8275.01	3968.04	553.66	272.04	50.16	100.57
103		5.62	DOWN	6399.73	1193.98	289.26	80.82	32.76	8.27	0.57	0.34	49.97	
			BETA	19.82	52.98	97.41	179.96	252.59	479.81	971.33	800.12		
102.81	67.38	4.98	UP	126522.35	63091.39	28099.06	14504.88	8271.12	3949.34	545.99	265.86	49.28	100.77
104		5.62	DOWN	6189.36	1150.21	277.72	76.09	29.48	9.87	1.02	0.57	49.94	
			BETA	20.44	54.85	101.18	190.63	280.57	400.14	535.28	466.42		

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